

NOVEL POLYPEPTIDES AND NUCLEIC ACIDS ENCODING SAME**RELATED APPLICATIONS**

5 This application claims priority to USSN 60/171,746, filed December 22, 1999, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Mammals are able to discriminate between thousands of odor molecules. This capacity
10 relies on a multigene family encoding 500 - 1000 olfactory receptors (ORX) *See* Buck et al.,
(1991) *Cell* **65**, 175-187. These receptors are expressed mainly in the olfactory epithelium and
have been found in a number of species including mammals, birds, amphibians, and fish. *See*
Buck et al., *supra*, (1991) *Cell* **65**, 175-187; Selbie et al., (1992) *Mol. Brain Res.* **13**, 159-163;
Rouquier et al., (1998) *Nature Genet.* **18**, 243-50.; Issel-Tarver et al., (1997) *Genetics* **145**, 185-
15 195; Sullivan et al., (1996) *Proc. Natl. Acad. Sci. USA* **93**, 884-888; Nef et al., (1992) *Proc. Natl.
Acad. Sci USA* **89**, 8948-8952; Leibovici et al., (1995) *Dev. Biol.* **175**, 118-131; Freitag et al.,
(1995) *Neuron* **15**, 1383-1392; Ngai et al., (1993) *Cell* **72**, 657-666.

All of these receptors belong to the G protein-coupled receptor (GPCR) superfamily and
share features of sequence and structure, such as seven hydrophobic transmembrane domains
20 (7TM).

The sense of smell plays an important role in mammalian social behavior, location of
food and detection of predators. However, mammals vary in their olfactory ability. *See* Moulton
(1967) *Am. Zool.* **7**, 421-429; Stoddart (1980) *The ecology of vertebrate olfaction* (Chapman and
Hall, New York).

25 In primates, the sense of smell is greatly reduced (*i.e.*, microsmatic) with respect to
other mammals such as dogs or rodents. *See* Moulton, *supra*; Stoddart, *supra*; Issel-Tarver, L.,
Rine, J. (1996) *Proc. Natl. Acad. Sci. USA* **93**, 10897-10902.

30 Various explanations for the differences in olfactory performance have been
hypothesized. Differences in the anatomical structures (size, location) devoted to olfaction could
partly explain these differences. For example, dogs, which have an olfactory sensitivity up to
100 times greater than humans, have on average ~100 cm² of olfactory epithelium while

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humans have only 10 cm².

Variations in the size and diversity of the expressed ORX gene family could also account for these differences. It has recently been demonstrated that the human ORX gene repertoire is distributed in over 25 chromosomal sites. Over 70% of these ORX genes are pseudogenes, *i.e.* 5 the sequences have accumulated deleterious mutations such as in-frame stop codons and/or indel frameshifts. *See* Rouquier et al., (1998) *Nature Genet.* **18**, 243-50. Thus, the reduction of the sense of smell observed in primates could parallel the reduction of the number of functional ORX genes.

10

SUMMARY OF THE INVENTION

The invention is based, in part, upon the discovery of novel polynucleotide sequences encoding novel polypeptides.

Accordingly, in one aspect, the invention provides an isolated nucleic acid molecule that includes the sequence an ORX nucleic acid molecule or a fragment, homolog, analog or derivative thereof. The nucleic acid can include, *e.g.*, a nucleic acid sequence encoding a polypeptide at least 80% identical to a polypeptide that includes the amino acid sequence of an ORX polypeptide. The nucleic acid can be, *e.g.*, a genomic DNA fragment, or a cDNA molecule.

15

Also included in the invention is a vector containing one or more of the nucleic acids described herein, and a cell containing the vectors or nucleic acids described herein.

20 The invention is also directed to host cells transformed with a vector comprising any of the nucleic acid molecules described above.

In another aspect, the invention includes a pharmaceutical composition that includes an ORX nucleic acid and a pharmaceutically acceptable carrier or diluent.

25

In a further aspect, the invention includes a substantially purified ORX polypeptide, *e.g.*, any of the ORX polypeptides encoded by an ORX nucleic acid, and fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition that includes an ORX polypeptide and a pharmaceutically acceptable carrier or diluent.

30

In still a further aspect, the invention provides an antibody that binds specifically to a ORX polypeptide. The antibody can be, *e.g.*, a monoclonal or polyclonal antibody, and

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fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition including ORX antibody and a pharmaceutically acceptable carrier or diluent. The invention is also directed to isolated antibodies that bind to an epitope on a polypeptide encoded by any of the nucleic acid molecules described above.

5 The invention also includes kits comprising any of the pharmaceutical compositions described above.

The invention further provides a method for producing an ORX polypeptide by providing a cell containing an ORX nucleic acid, *e.g.*, a vector that includes an ORX nucleic acid, and culturing the cell under conditions sufficient to express the ORX polypeptide encoded by the 10 nucleic acid. The expressed ORX polypeptide is then recovered from the cell. Preferably, the cell produces little or no endogenous ORX polypeptide. The cell can be, *e.g.*, a prokaryotic cell or eukaryotic cell.

15 The invention is also directed to methods of identifying an ORX polypeptide or nucleic acid in a sample by contacting the sample with a compound that specifically binds to the polypeptide or nucleic acid, and detecting complex formation, if present.

The invention further provides methods of identifying a compound that modulates the activity of an ORX polypeptide by contacting an ORX polypeptide with a compound and determining whether the ORX polypeptide activity is modified.

20 The invention is also directed to compounds that modulate ORX polypeptide activity identified by contacting an ORX polypeptide with the compound and determining whether the compound modifies activity of the ORX polypeptide, binds to the ORX polypeptide, or binds to a nucleic acid molecule encoding an ORX polypeptide.

25 The invention also provides a method for assessing the olfactory acuity of a subject by providing a biological sample comprising nucleic acids from the subject, identifying a plurality of nucleic acid sequences homologous to an olfactory receptor nucleic acid sequence, determining the number of sequences containing open-reading frames, determining the number of sequences containing olfactory receptor pseudogenes, and comparing the number of open-reading frames to the number of pseudogenes to assess the olfactory acuity of the subject. In one embodiment, the invention provides a method of determining the plurality of nucleic acids using 30 a pair of primers that selectively amplify an olfactory receptor nucleic acid sequence. In a further

embodiment, this pair of primers includes OR5B-OR3B (OR5B (TM2), 5'-
CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3'
(SEQ ID NO: 432) and 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ
ID NO:433). In a still further embodiment, the ratio of the number of sequences containing
5 open-reading frames to the number of sequences containing olfactory receptor pseudogenes is
calculated and compared to a reference ratio for an organism whose olfactory acuity is known.

Unless otherwise defined, all technical and scientific terms used herein have the same
meaning as commonly understood by one of ordinary skill in the art to which this invention
belongs. Although methods and materials similar or equivalent to those described herein can be
10 used in the practice or testing of the present invention, suitable methods and materials are
described below. All publications, patent applications, patents, and other references mentioned
herein are incorporated by reference in their entirety. In the case of conflict, the present
specification, including definitions, will control. In addition, the materials, methods, and
examples are illustrative only and not intended to be limiting.
15

Other features and advantages of the invention will be apparent from the following
detailed description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic phylogeny tree of the primate species used in the Examples.

20 FIG. 2 is a comparison of the deduced protein ORX sequences obtained from the different
primate species characterized. The dendrogram was established using the PileUp program from
the GCG Package. Percent amino acid similarity (ASI) was determined by pairwise sequence
comparisons using the Gap program and is indicated along the abscissa of the tree. Sequences
obtained from the literature are indicated by an asterisk. For example, human ORX sequences
25 derived from the use of the OR3B/OR5B primers and representing the main ORX families were
selected from Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum.*
Mol. Genet. 7, 1337-1345. Dog (CfOLF1 and its human counterpart HsOLF1; CfOLF2) and
chicken (COR4) sequences were selected from Issel-Tarver et al. (1997) *Genetics* 145, 185-195
and Leibovici et al., (1996) *Dev. Biol.* 175, 118-131, respectively. ORX families (greater than
30 40% ASI) are indicated by open circles and subfamilies (greater than 60% ASI) are indicated by

open squares. The main family was arbitrarily named family 1 and subdivided in two groups of subfamilies, 1-I and 1-II , which are indicated by ovals. Group 1-II further comprises subfamilies A and B. Beside each sequence name, black dots indicate sequences derived from the use of the OR3B/OR5B consensus primers, black squares those derived from the OR3.1/7.1 consensus primers, and black rectangles indicate potentially functional genes (uninterrupted ORFs). In the case of HSA 912-93 (black rectangle and double asterisk), the sequence contains only one nonsense point mutation in human, but potentially codes in other primates. See Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. In FIG. 2, the following abbreviations are used: human, HSA; chimpanzee, PTR; gorilla, GGO; orangutan, PPY; gibbon, HLA; macaque, MSY; baboon, PPA; marmoset, CJA; squirrel-monkey, SSC and SBO; lemur, EFU and ERU; zebrafish, DRE.

DETAILED DESCRIPTION OF THE INVENTION

Included in the invention are the novel nucleic acid sequences and their polypeptides. The sequences are collectively referred to as "ORX nucleic acids" or "ORX polynucleotides" and the corresponding encoded polypeptides are referred to as "ORX polypeptides" or "ORX proteins." Unless indicated otherwise, "ORX" is meant to refer to any of the novel sequences disclosed herein.

The ORX nucleic acids and polypeptides are described in more detail below.

20 OR1

LOCUS AF127814 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA13) gene, partial cds.

ACCESSION AF127814

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

Montpellier Cedex 5 34396, France

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		/db_xref="taxon:9557"
	gene	<1..>649
		/gene="PPA13"
10	CDS	<1..>649
		/gene="PPA13"
		/codon_start=2
		/product="olfactory receptor"
		/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILG
		TLLLTVAMYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLLHISLMTHLTFC
15		KDFEIPHFFCELTHIQLACSDTFLNSTLIYVMTGVLGVPPLLGIIFSYRSRIASSIRK
		MSSSGGKEKALSTCGSHLSVVSFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID NO:1).
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20		1 ctgggttgac atctgtttca gcacctgcat cgtccccaaatgctggtga acatccagac
		61 caagaacaaa acaatttcctt acatggactg cctcacccag gtctatttcttccatgtttt
		121 tcctattctg ggcacactac tcctgaccgt gatggcctat gaccggtttg tggccgtctg
		181 ccacccctcg cactataaa ccatcatgaa ccccccgcctc tggccctcc tggtttttgt
		241 cacgtggctc attgggttca tgacgtccctt cctccatatttctgtatgacatcta
		301 cttctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacata tcctccagct
		361 ggccgtctt gataccctcc tgaacagcac gtttatatat gttatgacgg gttgtgtgg
25		421 cgttttcccccccttc ttcctggga tcattttctc ttatccacga atcgatccat ccataaggaa
		481 gatgtcctca tctggggaa aagagaaagc acttttacc tggcccttc acctctccgt
		541 cgtttttta ttatggga caggcatgg ggtccacttc acttctgcgg tgactcatc
		601 ttcccagaac atctccgtgg cctcggtat gtagacgg gttacccccc (SEQ ID NO:2).
30	OR2	
	LOCUS	AF127815 642 bp DNA PRI 28-FEB-2000
	DEFINITION	Papio hamadryas PPA14 pseudogene, partial sequence.
35	ACCESSION	AF127815
	KEYWORDS	
	SOURCE	baboon.
	ORGANISM	Papio hamadryas
40		Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
		Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
		Papio.
	REFERENCE	1 (bases 1 to 642)
	AUTHORS	Giorgi,D.G. and Rouquier,S.P.
45	TITLE	The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
	JOURNAL	Unpublished
	REFERENCE	2 (bases 1 to 642)
	AUTHORS	Giorgi,D.G. and Rouquier,S.P.
	TITLE	Direct Submission
50	JOURNAL	Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
	FEATURES	Location/Qualifiers
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 121 cgcgtatgcgaaatgtgc ttctggctgt gatggctat gaccggtttggccatctg
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 241 gtctttctt cttagcctgt tggatcccaat gtcacacaat ttgatttgtt tacaacctac
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 421 cctcttcag ggatccctttt ctttactat aaaattttt cttccattcc gagagttcgc
 481 ttttcaggta ggaagtataa agcccttc acctgcagtc etcacetttc agttgtttgc
 541 ttatttatg gaacaggctt tggagggtac cttagttcag ctgtctctt cccccccagg
 601 aagggtgcag cggcctcagtgatgtacatgtt gtttttttttcc (SEQ ID NO:3).

OR3

20 LOCUS AF127816 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA15) gene, partial cds.
 ACCESSION AF127816
 25 KEYWORDS
 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 30 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 35 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 40 FEATURES Location/Qualifiers
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 KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVGVFPLLGIIFSYRIASSIRK
 MSSSGGKEKALSTCGSHLSVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID
 50 NO:4).

BASE COUNT 130 a 188 c 128 g 203 t
ORIGIN

1 ctgggttgc acatgtttca gcacctgcat cgccccaa agtctggta acatccagac
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5 121 tcctattctg gacacactac tcctgaccgt gatggctat gacccggttt tgccgtctg
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541 cgttctta ttatggga caggcattgg ggtccacttc acttctgcgg tgactcatc
601 ttcccagaac atctccgtgg ctcggatgat gtacacgggt gttacccccc (SEQ ID NO:5).

15 OR4

LOCUS AF127817 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA16) gene, partial cds.

ACCESSION AF127817

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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CDS <1..>649

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IKMEIPHFFCDLPEVLKLACSDTFINNVVIYFATGILAVIPFTGILFSYYKIVFSVLR

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50 NO:6).

BASE COUNT 130 a 176 c 136 g 207 t

ORIGIN

1 ctgggttgc acatgtttca gcacctgcat cgccccaa agtctggta acatccagac

61 caagaacaaa acgatttctt acatggactg ctcacccag gtctattctt ccatgtttt

DRAFT - EST 24/2/00

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5 361 cgccctgtct gacaccttca tcaataatgt agtgatatac ttgcactg gcattctgg
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481 gattccctca gctgggggaa agtacaaga ctttccacc tgggttccc acctctcaat
541 ggtcagcttg ttctatggca cgggccttgg ggtctatctc agttctgcag ctataccatc
601 ttctaggaca agtctggat cctcagtgtat gtacaccatg gtcacccccc (SEQ ID NO:7).

10

OR5

LOCUS AF127818 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA41) gene, partial cds.

15 ACCESSION AF127818

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

20 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

25 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

30 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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CDS <1..>649

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45 MSSSGGKEKALSTCGSHLSVVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID

NO:8).

BASE COUNT 130 a 188 c 128 g 203 t

ORIGIN

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121 tcctattctg gacacactac tcctgaccgt gatggcctat gaccggttt tggccgtctg

181 ccacccctg cactatataa ccatcatgaa ccccccgcgc tggtggctcc tggtttttgt

241 cacggtggctc attgggtgtca tgacatccct cctccatattt tctctgtatgac acatctaac

301 ctctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacatac tcctccagct

361 ggccgtctt gataccttc tgaacagcac gtgtatatat gttatgacgg gtgtgcgg
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481 gatgtcctca tctggggaa aagagaaagc actttctacc tgtggcttc accttcgg
541 cggtttcta tttaatggaa caggcatgg ggtccacttc acttctgcgg tgactcatc
601 ttccccagaac atctccgtgg cctcggtgat gtacacgggt gttacccccc (SEQ ID NO:9).

OR6

LOCUS AF127819 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA42) gene, partial cds.
 ACCESSION AF127819
 KEYWORDS
 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
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 GSHEVPHYFCDLTPILRLSCTDTSVNRIFILIVAGMVIATPFICILASYARILAAIMK
 VPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCPSSVRTAVKEKASAVMYTAVTP" (SEQ ID
 NO:10).
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 181 ccacccgttg cactacgcca cgtatcatgag cccacgcctc tgtggcttc tggtcgccgt
 241 cccctggcg tttctgtctt catctcttccatc ctccatgtgg cccgcctcg
 301 ttctcgccg agccacgagg tgccatcta ctctcgacat ctcactccca tcctccgact
 361 ttctgtgcaca gacacatcg tgaacaggat ctcatcttc attgtggcgat ggatgggtgat
 421 agccacgccc ttcatctgc tccatgtgc ctatgtgc atccatgcgg ccatcatgaa
 481 ggtcccccttgcaggccgat ggaagaaatc ttctccaccat tgcagctccc acctgtctg
 541 gggttgccttc ttctatggat ccacccattgg tttctatctg tttcccttc cggatccgcac

601 ggctgtgaag gagaaagctt ctgccgtat gtacacaga gtcacccccc (SEQ ID NO:11).

OR7

5 LOCUS AF127820 641 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas PPA43 pseudogene, partial sequence.
ACCESSION AF127820
KEYWORDS
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 641)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 641)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..641
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>641
/gene="PPA43"
/pseudo
30 BASE COUNT 126 a 172 c 123 g 220 t
ORIGIN
1 ctggcctgac atcagttca ccctggccat ggtccccaag atgattgtgg acatgcaatc
61 gcatagcaga gtcatctccc acgcggactg cctggcacag atgtctttct ttgccttt
35 121 tgcatgtata gatgacatgc tccctactgt gatggctat aactgatttg tggccatctg
181 tcacccctcg cactaccag tcatcatgaa tccctcacttc tggtcttct tagtttggt
241 gtcctttcg tcagcgtgtt ggattccag ctgcacaatt tgattgtgtt acaaacttacc
301 tgcttcaatg atggaaat ctctaaattt ttctgtgacc ctctcaact tctcaatctt
361 agccctgcct gacacataac atagcgtat attttattgg taccatattt ggtttcttc
40 421 ctctctcagg gatcctttc tttaactata aaattgttcc tcccaattcc agagtcgt
481 ctccaggtag gaagtataaa gccttctcca cctgcagtc tcacccttca gttgtttgt
541 tattttatgg aacagccctt ggagggtacc tcagttcage tgcgtctc cccccccagga
601 agggtgacgc ggcctcagtg atgtacatgg tggtcacccccc c (SEQ ID NO:12).

OR8

45 LOCUS AF127821 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA68) gene, partial cds.
ACCESSION AF127821
50 KEYWORDS
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>649
 /gene="PPA68"
 CDS <1..>649
 /gene="PPA68"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FIDVCFVSTTVPKMLVNIQTQSRVITYAGCITQMCFIFLAGLD
 IFMLTVMA YDRFVAICHPLHYTVMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
 ADLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGGGALSGILYSYSKIVSSIRG
 TSSAQGKYKAFSTCASHLSVSVLFYGTLLGVYFSSAATRNSHSSAAASVAMYTVVTP" (SEQ ID
 NO:13).
 BASE COUNT 122 a 177 c 146 g 204 t
 ORIGIN
 1 ctccatagac gtctgtttt tgcaccac tggccgaaatgcgttgacatccagac
 61 acagaggaga gtcataacct atgcaggctg catccccatgcgtttt tcataatttt
 121 tgccggactg gatatctta tgcgtaccgt gatggctat gacaggtttggccatctg
 181 tcacccccctg cactacacgg tcacatggaa cccccaggctc tggactgc tggctctgc
 241 gtccctggatc atgatgtccc tgaattctt gttggaaatgcgttat tgcacccatc
 301 ctctgtgtca gacttggaaa ttccccactt ttctgtgaa ctaatcagg tggccacact
 361 tgccctgttct gacacccttc ttaatgacat ggtgtatgtat tggcatctgc cgctgtgg
 421 cggtgtgtgcc ctctctggaa tccctttatc ttatctaaatcgttccct ccatacgtgg
 481 aacctcgica gtcaggggaa agtacaaggc atttccacc tggcatctc acctctcggt
 541 tgctcccta ttatggta cgctccttagg agtgtactt agtctgctg caaccctgaa
 601 ctcacactca agtgcgtcag ctcgggtat gtacactgtg gttacccccc (SEQ ID NO:14).
OR9
 LOCUS AF127822 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA72) gene, partial cds.
 ACCESSION AF127822
 KEYWORDS
 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
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 /db_xref="taxon:9557"
 gene <1..>649
 /gene="PPA72"
 CDS <1..>649
 /gene="PPA72"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FIDICFVSTTVPKMLVNIQTQSRVITYAGCITQMCFIIFAGLD
 IFMLTVMAFDRFVAICHPLHYTVMNPKLCGLVLASWIMNALNSSLQLSIVLRLSFC
 TDLEIPHFFCELNQVVHLACSDTFLNDMGMYMASALLGGGALSGILYSYSKILSSIRG
 TSSAQGKYKAFSTCASHLSVVSIFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID
 NO:15).
 BASE COUNT 124 a 179 c 144 g 202 t
 ORIGIN
 1 ctccatagac atctgttttg tgccaccac tgccccgaag atgctggtga acatccagac
 61 acagaggcaga gtcacacccat atgcaggctg catcacccag atgtgtttt tcataatttt
 121 tgccggactg gatatctta tgctgaccgt gatggccctt gaccgggtttg tggccatctg
 181 tcacccctcg cactacacgg tcaccatgaa ccccaagctc tgtggctgc tggttctggc
 241 gtcctggatc atgaatgcc tgaattccctc gttacaagc ttaatagtgc tgccgccttc
 301 ctctgcaca gacttggaaa ttccccactt ttctgtgaa cttaatcagg tggtccacct
 361 tgcctgtct gacaccccttcaatgacat ggggatgtat atggcatctg ctctgtggg
 421 cggtgtgccc ctctctggga tcctttatcc ttatctaag atcccttccct ccatacggttgg
 481 aaccatgtca gtcaggggaa agtacaaggc atttccacc tgcacatctc acctctcggt
 541 tgcctttatccatggta cgcccttagg agtgtactttt agtctgtctg caactcgtaa
 601 ctcacactca atgcgtcag ctcgggtgtat gtacacgggtt gttacccccc (SEQ ID NO:16).

OR10

40 LOCUS AF127823 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA79) gene, partial cds.
ACCESSION AF127823
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>649
 /gene="PPA79"
 CDS <1..>649
 /gene="PPA79"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDVSYATSVIPQLLAHFLAEHKAISSLQSCAAQLFFSLALGGIE
 FVLLAVMAYDRYVAVCDPLRYSATMHGALCAKLAITSWVSGSINSLMHTTITFQLPMC
 TNKFINHIFCEILAVIRLACVDTSSNEVTIMVSSIVLLMTPCLVLLSYIRIISTILK
 IQSREGRRKAFHTCASHLTVALCYGMAIFTYIHPHSSPSVLQEKLISLFYAILTP" (SEQ ID
 NO:17).
 BASE COUNT 135 a 185 c 133 g 196 t
 ORIGIN
 1 ccttgtcgat gtctcctatg ccacaagcat agtcccttag ctgtggcac atttcttg
 61 agaacataaa gccatctcg tgcagagctg tgccggccaa ttattttctt ccctggcatt
 121 gggtgggatt gagtttgc tcctggcagt gatggcctat gaccgctat tggctgtgt
 181 tgacccccctg cgataactcg ccaccatgca tggagcgcata tggctaaat tggccatcac
 241 atcctgggtc agtggatcca ttaactctt catgcataacc accatcacct ttca
 301 catgtgcaca aacaaggat ttaatcatat attctgtcaa attctagctg tgatcaggct
 361 ggccttgtgtg gacaccctct ccaacgaggat caccatcatg tggcttagca ttgttcttct
 421 gatgacaccc ttatgtctgg ttctttgtc ttacatccgg atcatcttca ccatctaaa
 481 gatccagtc agagaaggaa ggaggaaagc cttccacacg tggcccttc acctcacatg
 541 gggtggccctg tgctatggca tggccattt cacttacatc catccccact ccagtccctc
 601 tgcccttcag gagaaggatgaa ttatgtctttt ttatgtccatt ttgacaccca (SEQ ID NO:18).

OR11

35 LOCUS AF127824 649 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes olfactory receptor (PTR12) gene, partial cds.
ACCESSION AF127824
KEYWORDS .
40 SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649

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DRAFT 2/2/2000

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gene /organism="Pan troglodytes"
gene /db_xref="taxon:9598"
gene <1..>649
CDS /gene="PTR12"
CDS <1..>649
CDS /gene="PTR12"
CDS /codon_start=2
CDS /product="olfactory receptor"
CDS /translation="FLEIGFNLIVPKMLGTLLAQDTTISFLGCATQMYFFFFFGVAE
CFLLATVAYDRYVAICSPHYPVIMNQRTRAKLAAASWFPGPVATVQTTWLFSFPFC
RTNKVNHHFFCDSPPVRLVCADTALFEIYAVGTLVVMIPCLLILCSYTRIAAILK
IPSAKGKNKAFSTRSSHLLVVSLFYISLSLTYFRPKSNNSPEGKKLLSLSYTVMTP" (SEQ ID NO:19).

BASE COUNT 132 a 193 c 129 g 195 t
ORIGIN

1 tttccggag attggcttca acctagtcat tgtccccaa atgctgggaa ccctgctgc
61 ccaggacaca accatcttc ttctggctg tgccactcag atgtatttct tcttcttct
121 tggagttgc gaatgttcc ttctggctac cgtggcatat gaccgctatg tgcccatctg
181 cagtcccttg cactacccag tcatacatgaa ccaaaggaca cggggcaaac tggctgtgc
241 ctctgggtc ccagggttc ctgttagctac tggcagacc acatggctct tcagtttcc
301 attctgtcgc accaacaagg tgaaccactt ctctgtgac agcccacctg tgcgtgaggt
361 ggtctgtca gacacagcac tggatggat ctacgcccac tgcggaccca ttctgggtgt
421 catgatcccc tggatggat ctatactcgcc attgtcgctg ccattctcaa
481 gatcccatca gctaaaggaa agaataaagg ctttctaca cgttccac acctccctgt
541 tgcgtctttt ttctatatat cattaaaggct cacatattt cggccataat caaataattc
601 tcctggggc aagaaggctgc tatgttgc ctacactgtt atgactccc (SEQ ID NO:20).

OR12

30 LOCUS AF127825 650 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR2 pseudogene, partial sequence.
ACCESSION AF127825
KEYWORDS
SOURCE chimpanzee.
35 ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
40 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
50 /organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>650
gene /gene="PTR2"
gene /pseudo

BASE COUNT 127 a 202 c 131 g 190 t
ORIGIN

5 1 ctttgccatg atctgttct ctcaccac cgccccaaatgcggcca atcacatact
61 cgggactcg accatctctc ttgtggctg ttccacacag atgtattcg tttcatgt
121 tggacatg gacaattcc tcctagctgt gatggcttat gaccgccttg tcggcggtg
181 ccaccccta cattacacag caaagatgac ccacatgc tggccctgc tggttgtgg
241 attatgggtt gttcccaacc tgaatgtcct tcgtcacacc ctgcgtatgg ctgcactctc
301 attctgtgca gacaatgcca tccttcactt ctctcgat gtgactcccc tactgaaact
361 ctccgtctca gacacacacc tcaatgaggc cataatcctt agtgagggtt ccctggcat
421 gatcaccatc ttctttgca tcctggcttc ttatgcac atcacatgc ctgtcctgag
481 ggcccatcc acaaaggaa ggtggtaagg ctctccacc tggcccttc acctggctgt
541 ggttctacct ctctatggc accatattg ctgtgttta taaccctctg tcctcccact
601 cagcagagaa agacactacg gctactgtgt tgcatacgt agtgactccc (SEQ ID NO:21).

15 OR13

LOCUS AF127826 649 bp DNA PRI 28-FEB-2000

DEFINITION Pan troglodytes PTR3 pseudogene, partial sequence.

ACCESSION AF127826

20 KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

25 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..649

/organism="Pan troglodytes"

/db_xref="taxon:9598"

40 gene <1..>649

/gene="PTR3"

/pseudo

BASE COUNT 146 a 166 c 121 g 216 t

ORIGIN

45 1 ctttgtat ttctgtttt ccaccacagt tacacccaaa ctgtggaga actgggtgt
61 ggaagacaga accatctctc tcacaggatg catcatgaa ttcttcgg cgttatatg
121 tgcgtggca gaaacattca tgctggcgt gatggcttat gattgatacg tggcgttgt
181 taacccttg ctctacacag ttgtcaggc ccagaaactc tggcatcat tagtggcagg
241 gccctacaca tgggtataa ttcttcctc gacactcacc tatttcctc tgcatttac
301 ctctgtggg tctaacaatgg tgcgtgttag gactctgtca tcatttcgt
361 ctccgtctc gaccctaca tcagccaaat gcttgggtt gtcattgca tattcaatga
421 ggtagcgc ttgggagtc tcctcaactac ctatatttc atctttattg ctgtcataaa
481 aatgccttc gctgtggc accaaaaagg ttctctacc tgcgttccc acctgactgc
541 catcaattt ttccatggca ctgtcgtttt ccattttgtt gtaccaact caaaaactc
601 atggcata gtcacaaatgg gttctgtgtt ttatcagtc atcatcccc (SEQ ID NO:22).

OR14

LOCUS AF127827 651 bp DNA PRI 28-FEB-2000
5 DEFINITION Pan troglodytes PTR4 pseudogene, partial sequence.
ACCESSION AF127827
KEYWORDS
SOURCE chimpanzee.
ORGANISM Pan troglodytes
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..651
/organism="Pan troglodytes"
25 /db_xref="taxon:9598"
gene <1..>651
/gene="PTR4"
/pseudo
30 BASE COUNT 131 a 166 c 134 g 220 t
ORIGIN
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241 tgctttttt ttttttcata gtcttcaga ctcccaactg cacaacttga ttgccttaca
301 aatgacactgc ttcaaggatg tggaaattcc taatttcttc tggaaacctt ctcaactctc
361 ccatcttgca tggatgtgaca ctttcaccag gaacatcagt atttccctgc tgccatattt
421 ggttttcttc ctatctcaca gatcatttc ttttactata aaatgtttc ctccatgctg
481 agtgtttcat catcaggatgg gaagtataaa gccttctcca actgtgggtc tcccctgtca
541 gttttttgttattttatgg gaaaggatc ggggggttacc tgagttcaga tgtgtcatct
601 tccccccagaa agggatcagt ggcctcagt atgtacacgg tgatcacccgc c (SEQ ID NO:23).

OR15

45 LOCUS AF127828 657 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR5 pseudogene, partial sequence.
ACCESSION AF127828
KEYWORDS
SOURCE chimpanzee.
50 ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 657)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

10 source 1..657
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>657
/gene="PTR5"
15 /pseudo

BASE COUNT 128 a 173 c 137 g 219 t

ORIGIN

1 ctgcctgac atcggttca ctcaggcat ggtcccaag atgattgtgg acatccagtc
61 tcacaggaga ctcatctctt aggcaggctg ctttgactcc atgtccctct ttgcatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatgg ccattaccgg ttgtggcca
181 tctgtcaccc tatatatcat tcaaccatca tgaacccgtg ttctgtggc ttcttagttt
241 tttttttttt cagtccttttta gacgcccagc tgccacaactt gatggcccta
301 caaatgacct gctcaagga tttggaaatt cctaattct tctggaaacc ttctcaactt
361 ccccatcttg catgtgcga caccctcacc aataacataa tcatgtattt ccctgtgcc
421 atatgggtt ttcttccat ctggggacc cttttctttt attataagat tttttctcc
481 attctgaggg ttcatcatc aggtggaa tataaggct gctccaccc tgggtctcac
541 ctgtcagtgtt ttgtgttattt ttatggaa tgcgtggag ggtacccatg ttcatgtgt
601 tcatctcccc ttagataggc tgcatgtggcc tcagtgtatg acacgggtt caccctt (SEQ ID NO:24).

30 OR16

LOCUS AF127829 657 bp DNA PRI 28-FEB-2000

DEFINITION Pan troglodytes PTR6 pseudogene, partial sequence.

ACCESSION AF127829

35 KEYWORDS

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

40 REFERENCE 1 (bases 1 to 657)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

45 REFERENCE 2 (bases 1 to 657)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..657
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>657

/gene="PTR6"
 /pseudo
 BASE COUNT 133 a 171 c 131 g 222 t
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 61 tcacagcaga gtcatctgct atgcagggtg cctgactcgatgtctct ttgcatttt
 121 tggaggcatg gaagagagac atgcctctga atgtgatggc ctatgtccgg ttgttagcca
 181 tctgtcaccc tctatatcat tcagccatca tgaaccctgt ttctgtggc ttccacttt
 241 tttttttc gcggctttt agatcccag ctgcacaaca tgatgcctt
 10 301 acaaaccgacc tgctcaagg atgtggaaat tcctaatttc ttctgtgatc ctctcaact
 361 accccaccc tcatgttg acaccctcac caataacatc atcatgtatt tccctgctgc
 421 cctatttttgc ttccctccca tctcggggac cctttctct tactgtaaaa ttgttcctc
 481 cattctgagg gtttcatcat caggtggaa gtataaacct tctccacctg tgggtctcac
 541 ctgtcagttt ttgtctgatt ttatggaaa ggccgtggag ggtacctcg tcagatgt
 15 601 tcacatccc tgagaaaggc tcagtggcc tcagtatgt acaagatgtg cactccc (SEQ ID NO:25).

OR17

09747155
 20 LOCUS AF127830 650 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes PTR7 pseudogene, partial sequence.
 ACCESSION AF127830
 KEYWORDS
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 650)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 30 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 650)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 35 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..650
 40 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>650
 /gene="PTR7"
 /pseudo
 BASE COUNT 122 a 168 c 127 g 233 t
 45 ORIGIN
 1 ctggctgac atcggtttg cctctactac tgtccccaa agtattgtgg acatccaggc
 61 tcacagttaga ctcatctttt acgttaggtg cctgactcgatgtctttt tgatcctttt
 121 cccatgtatg gaaagtctgc tccgtattgtt gatggcttat gaccgggtcg tgaccatctg
 181 tcacccctgtg cactaccaag tcacatcatgag cccacgactc tggctctct tagttttgg
 50 241 gtctttttt cttagccctt tggactctca gtcgcacaat ttgttgttataacttac
 301 ctgcctcaac gatgtggaaa tctcttaattt ttctgtga ccctcttaa ctctcaacc
 361 tggctgttc tgacacccatc attataaca tgggtgtata ttatgggtt gcatatttg
 421 gtttctccc tctcttaggg atcccttttcttactataa aattgttcc tccatctga
 481 gagttcttc ttcagggtgg aagtataag cttctccac ctgcagctct cacatgtcag

541 ttgttgctt atttatgga acagccctg gagggtacct cagttcagct gtgtccctt
601 cctccagggaa gggtcagtg gcctcagtga tgtacatgtt ggtcaccccc (SEQ ID NO:26).

OR18

5 LOCUS AF127831 663 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR8 pseudogene, partial sequence.
ACCESSION AF127831
KEYWORDS
10 SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 663)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 663)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..663
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>663
/gene="PTR8"
/pseudo
30 BASE COUNT 129 a 171 c 139 g 224 t
ORIGIN
1 ctggcctgac atcggttca cctccaccac ggtccccaag atgattgtgg acatccagtc
61 tcacagcaga gtcatttcct atgcaggctg cctgactcag atgtctctt ttgccattt
121 tggagggcatg gaagagagac atgctctga atgtgacggc ctatgaccgg ttttaggca
181 tctgtcaccc tctatatcgt tcagccatct tgaaccgggtg ttctgtggc ttcttaggt
241 ttttgtctt gatttttt ttttctcag tcttttagac tcccagctgc acaacttgt
301 tgccctacaa atgacctgct tcaaggatgt ggaaattcct aatttctcc ggaaaccttc
361 tcaactcccc catcttgcat gtgtgacac cttcactagg aacatcaaca tgtatttct
361 tcaactcccc catcttgcat gtgtgacac cttcactagg aacatcaaca tgtatttct
361 tcaactcccc catcttgcat gtgtgacac cttcactagg aacatcaaca tgtatttct
421 tctgtccata ttgggtttc ttcccatctc ggggaccctt ttctcttact gtaaaattgt
481 ttccctccatt ctgagggttt catcatcagg tggaaagtat aaacccatc cacttgtgg
541 tctcacctgt cagttgttg ctgatttat ggaacaggcg ttggagggtt cctcggtca
601 gatgtgtcat cttcccgag aaagggtgca gtggcctcag tgaatgtacac ggtggtacc
661 ccc (SEQ ID NO:27).

45

OR19

LOCUS AF127832 677 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR9 pseudogene, partial sequence.
ACCESSION AF127832
KEYWORDS
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 677)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 5 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 677)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 10 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..677
 /organism="Pan troglodytes"
 15 /db_xref="taxon:9598"
 gene <1..>677
 /gene="PTR9"
 /pseudo
 20 BASE COUNT 129 a 170 c 143 g 235 t
 ORIGIN
 1 cttagtgc acatcggttca cctccatcac agtccccaa agtattgtgg acatctagtc
 61 tcacagcaga gtcatctgct atgcagggtt cctgactcag atgtctctt ttgccattt
 121 tggaggcatg gaagagagac atgctctga gtgtgatggc ctatggccgg tttagccca
 181 tctgtcaccc tcacatatcg tcaagccattt tgaaccgggtt ttctgtggc ttccctagatt
 241 tttttttttt tttttttt tttttttt tttttttt caggctttta gactcccagg
 301 tgacaaactt gattgcctta caaatgacgt gttcaaggta tttggaaatt cctaatttct
 361 tctgggaacc ttctcaactc gcccatttg catgttggaa cacccatcacc aggaatata
 421 acctgtatattt ccctgtcgcc gtatgggtt ttctccat ctcggggacc cttttctt
 481 actgtaaaat ttttttttcc attctgaagg tttcatcatc aggtggaaac tataaaggct
 541 tctccaccc tgggtctcac ctgtcgttgg tttgttattt ttatggaaaca ggcgttggag
 601 ggtacctcg ttcatgtgt tcatctccccc ccagaaagggt tgcaatggcc tcagtgtat
 661 acacgggttggt cacccttcc (SEQ ID NO:28).

OR20

LOCUS AF127833 643 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA45 pseudogene, partial sequence.
 ACCESSION AF127833
 KEYWORDS
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 643)
 35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 643)
 40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers

source 1..643
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>643
/gene="HLA45"
/pseudo

5 BASE COUNT 131 a 168 c 127 g 217 t
ORIGIN

10 1 ctggctgac atcacttca cctcggccat ggtcccaag atggtgtgg acatgcagtc
61 gcatagcaga gccatctt atgcaggctg cctgacacag atgtcttct ttgccttt
121 gcatgtatag aagacatgt cctgactctg atggcctatg accgatttg ggccatctgt
181 cacccctgc actacccagt catcgtaat cctcacctct gtgtcttct agtttgg
241 tcttttcc tttagcctgtt ggattccag ctacacagct ggatttgtt tacaattcac
301 ctcttcaga aatggaaatc tctaatttt tctgtgaccc gtctcaactt ctaaccctg
361 cctgttctga cagcatcatc gataacatata tatatattta gatagcccta tattttgg
421 tcttccatt tcagggatcc ttttgttta gtataaaattt gtctccccca ttccgagaat
481 tccatcatca gatggaaagt ataaaggctt ctccacctgt ggctctacc tggcagttgt
541 tgcatttat gaaacaggca ttggcgtgtt cctgacttca gctgtgtcat catccccag
601 gaatggtgtt gtggcgtcag tgatgtatgc tgtggtcacc ccc (SEQ ID NO:29).

20 OR21

LOCUS AF127834 648 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA46 pseudogene, partial sequence.
25 ACCESSION AF127834
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
30 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
35 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
40 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Hylobates lar"
/db_xref="taxon:9580"
45 gene <1..>648
/gene="HLA46"
/pseudo

BASE COUNT 131 a 170 c 143 g 204 t
ORIGIN

50 1 ctggctgac atctgttca cctccaccac gatgcccaag atgtgggtga acatccaggc
61 acagactcaa tccatcgtt acacaggctg cctcacccaa atctgcttgc ttctggtttt
121 tggatggattt gaaaatggaa ttctggatcat gatggcctat gatcgatttg tggccatctg
181 tcacccactg aggtacaatg tcatcatgaa cccaaactct gtgggctgct gcttctgctc
241 tccttcatca ttagtgcctt ggacgctctg ctgcacacagt tgatgtgtt acggcgtacc

301 ttctgcacag acctggaaat tccccactt ttctgtgaac tagtcatgt tctcaagctc
361 gcctgttctg atgcctcat taataacatc ctgggtatt tggtgaccgg cctgttaggt
421 gttgtccctc actctggat catttctt tacacacgaa ttgcctcc tcgtcatgaaa
481 attccattag ctgtggaaa gtataaagct tttccatct ggggtcaca cttaatcgctc
541 gttgtctgt tctatggaaac agggtttggg gtgtaccta gttctggggc taccactcc
601 tctaggcagg gtcaatagc atcagtatgt tataccgtgg tcacccccc (SEQ ID NO:30).

OR22

10 LOCUS AF127835 660 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA47 pseudogene, partial sequence.
ACCESSION AF127835
KEYWORDS
SOURCE common gibbon.
15 ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
30 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>660
/gene="HLA47"
/pseudo
35 BASE COUNT 127 a 182 c 137 g 214 t
ORIGIN
1 ctcgcctgac atcggttca cttccaccac agtccccaaat attattgtgg acatcaaatc
61 tcacagcaga gtcatctctt aggccaggctg cctgactctg acctctctt ttgccatttt
121 tggaggcattt gaagagagac acgctcttga gtgtatggc ctatgaccgg tttagcc
40 181 tctgtcaccc tctatatcat tcggccatga tgaaccccttgc ttctcgcc ttcttagttt
241 tttttttttt ttcagtcattt cttagactccc agctgcacaa ctgtatttgc
301 ttgctaacga cctgttcaa gggtgccgaa attcctaatt tcttctgtga cccttctcaa
361 ctccccatc ttgcatttgc tgacacccctt accaataaca taatcatgtt tttccctgt
421 gccgtatttgc gttcccttcc catctgggg accctttctt cttactataaa aatggttcc
481 tccattcttgc ggttttccatc gtcaagggtggg aagtataaag ctttcacac ctgtgggtt
541 catctgttcag ttgtttgcgtt agtttatggaa agaggcggtt gaggataacct cagttcagat
601 gtgtccctttt ccccccagaaa ggttgcgttgc gcctcagtta gttacacggt ggtcacccccc (SEQ ID NO:31).

OR23

50 LOCUS AF127836 649 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar olfactory receptor (HLA48) gene, partial cds.
ACCESSION AF127836
KEYWORDS

SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 15 FEATURES Location/Qualifiers
 source 1..649
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA48"
 CDS <1..>649
 /gene="HLA48"
 /codon_start=2
 /product="olfactory receptor"
 /translation="WVDICFGTCIIPKMLVNIQTKNAISYMDCLTQVYFSMLFPILD
 TLLLTVMAYDRFVAICHPLHYMIIMNPRLCGLLIFIVLIGVMTSLLHISMMHLIFC
 KDFEIPHFFCELTHILQLARSDTFLNSTLIYFMTGVLFVPLLGIIFSYSRIASSIRK
 MSSSGGKQKALSTCGSHLSVSLFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID
 20 NO:32).
 30 BASE COUNT 133 a 190 c 124 g 202 t
 ORIGIN
 1 ctgggttgc atctgttcg gcacttgc catcccaag atgctggta acatccagac
 61 caagaacaaa gccatctct acatggactg cctcacacag gtctattctt ccatgcttt
 121 tcatttctg gacacgtac tcctgaccgt gatggcctat gaccggttt tggccatctg
 181 ccacctctg cactacatga tcatcatgaa ccccccgc tgcgcctcc tgattttgt
 241 catctggc tttttgtca tgacatccct cttccatatt tctctgtatga tgcacatcta
 301 ctctgtaaa gattttgaaa ttccacattt ttctctgatca ctgacacaca tctccagct
 361 gccccgc tcatccatcc tgaacagcac gtttgatatac ttatggacag gtttgctgg
 421 cgttttccct ctcctggaa tcatcttc ttatggacatgatccat ccataaggaa
 40 481 gatgtccatca tctggggaa aacaaaaaagc acttccacc tttgggttc acctctccgt
 541 ttttttttta ttatggaa caggatgg gttccacttc acttctgcag tgactcacgc
 601 ttcccagaaa atctccgtgg cctcggtat gtacactgtg gtcaccccc (SEQ ID NO:33).
 45 OR24
 LOCUS AF127837 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA5) gene, partial cds.
 ACCESSION AF127837
 KEYWORDS
 50 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
5 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
10 FEATURES Location/Qualifiers
source 1..649
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>649
15 /gene="HLA5"
CDS <1..>649
/gene="HLA5"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSTCIIPKMLVNIQTKNAISYMDCLTQVYFSMLFPILD
TLLLTVMAYDRFVAICLPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
KDFEIPHFFCELTHILQLACSDTFLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
20 MSSSSGGKQKALSTCGSHLSVVSFYGTGIVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID
NO:34).
25 BASE COUNT 133 a 189 c 124 g 203 t
ORIGIN

1 ctgggttgcacatctttca gcacttgcataccccaaag atgctggta acatccagac
61 caagaacaaa gccatctctt acatggactg cctcacacag gtctattctt ccatgtttt
121 tcatttcgt gaeacgctac tcctgaccgt gatggctat gaccggtttg tggccatctg
181 ccccccctcg cactacatga tcatcatgaa ccccccgcctc tgatggctcc tgattttg
241 catctggctc attgggtca tgacatccctt cctccatattt tctctgtatga tcatctaat
30 301 ctctgtaaa gattttgaaa ttccacattt ttctcgaaaa ctgacacaca tcctccagct
361 ggcctgcctc gataccttcc tgaacagcac gtgtatatac ttatgacag gtgtgctggg
421 cggtttcccc cccttggga tcatttctc ttatcacga attgttcat ccataaggaa
481 gatgtccca tctggggaa aacaaaaaagc actttccacc tgggtctc acctctccgt
541 tgggtttta ttatggga caggcattgg ggccacttc acttctgcag tgactcacgc
601 ttcccaaaaa atctccgtgg cctcggttatgtatgcacacggtg gtcacccccc (SEQ ID NO:35).

OR25

40 LOCUS AF127838 651 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA6 pseudogene, partial sequence.
ACCESSION AF127838
KEYWORDS
45 SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 651)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..651
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>651
/gene="HLA6"
/pseudo

BASE COUNT 127 a 176 c 139 g 209 t

ORIGIN

1 ctggcctgac atcggttca ccaccaccac ggtccccc gag atgattgtgg acatccaatc
15 61 tcacagcaga gtcatctcct agg caggccg cctgactcac atgtctctt ttgcatttt
121 tggaggcatg gaagagagac atgctctga gtgtatggc ctatgacagg tttagccaa
181 tctgtcaccc tctatcatc tcagccatca tgaacccgtg ttctgtggc ttcttagtg
241 tctttttt ctctcagtct tttagaggcc cagtcgcata acttgtgc ctgtcaatg
301 acctgcttca aggatgtgga aattccta atccctgtg accccttca atccgcctat
361 ctgcatgtt gtgacatctt cacaataac ataatcatgtt atttccctgc tgccgtattt
421 gggttcccttc ccatctcggg gacccttcc tcttactata aaatggtttc ctccattctg
481 aggcattcat ctcaggtgg gaagtataaa gccttctca cctgtgggtc tcacctgtca
541 gtgtttgtc gagtttatgg aagaggcggtt ggagggtacc tcagttcaga tgtgtccctt
601 tccccagaa agttgcagt ggcctcagt atgtacacgg tggcaccc c (SEQ ID NO:36).

25 OR26

LOCUS AF127839 644 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA7 pseudogene, partial sequence.

30 ACCESSION AF127839

KEYWORDS

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

35 REFERENCE 1 (bases 1 to 644)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

40 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 644)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

45 FEATURES Location/Qualifiers

source 1..644
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>644
/gene="HLA7"
/pseudo

BASE COUNT 130 a 168 c 128 g 218 t

ORIGIN

1 ctgggtgac atcacttca cctcgccat gggtccaaag atgattgtgg acatgcagtc
 61 gcatagcaga gccatctt atgcaggctg cctgacacag atgtcttct ttgccttt
 121 tgcgtatg gaagacatgc tcctgactct gatggctat gaccgattt tggccatctg
 181 tccccctg cactaccag tcatgtgaa tcctcaccc tggtctct tagtttgtt
 241 gctttttc cttagcctgt tggattcca getacacagc tgattgtgt ttacaatcca
 301 cctctcaa gaatggaaat cttaatttt ttcgtgacc cgctcaact tctaaccct
 361 gcctgtctg acagcatcat cgataacata ttatatattt agatagccct atattgggt
 421 ttccatccc ttagggatc cttttgtt agtataaaaat tgctcccc attctgagaa
 481 ttccatcgta agatggaaag tataaaggct tctccacctg tggtctcac ctggcagtg
 541 ttgcattta tgaaacaggc attggcgtgt acctgacttc agctgtgtca tcatccccca
 601 ggaatgggt ggtggcgtca gtatgtatg ctgtggc accccc (SEQ ID NO:37).

OR27

15 LOCUS AF127840 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA74) gene, partial cds.
 ACCESSION AF127840
 KEYWORDS
 SOURCE common gibbon.
 20 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 30 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 35 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA74"
 CDS <1..>649
 40 /gene="HLA74"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDFCYSTTITPKLLENLVVEYRTISFTGCIMQFFLVCIFVGTE
 TFMLAVMAYDRCVAVCNPLLYTVAMSQRQLCSLLVATSYSWGIVCFLTLTYFLLELSFR
 45 GNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITVMK
 MPSTGGRKKAFSTCASHLTAITIFHGTLFLYCVPNSKSSWLMVKVTSVFYTVFIP" (SEQ ID
 NO:38).
 BASE COUNT 142 a 157 c 129 g 221 t
 ORIGIN
 50 1 ctttgttat ttctgttatt ctactacgt tacacccaa ctgtggaga acttgggtt
 61 ggaatataga actatccct tcacaggatg catcatgcaa ttctccctg tctgtatatt
 121 tgttagggaca gaaacattca tgctggcagt gatggctat gaccgatgtg tggcggtgt
 181 taaccctt ctctacacag ttgcaatgtc ccagaggctt tgctccctgt tggggctac
 241 atcatactt tggggatag tctgtttccct gacacttacc tactttctac tggattatc

301 cttcagagga aataatatca ttaataactt tgtctgtgag catgctgccca ttgttgctgt
361 gcttgcctct gaccctatg tgagccagga gatcacatca gtttgcctca cattcaatga
421 aataaggcagt ctgatgtatca ttttcaatc ctatcatttc atttttatca ctgtcatgaa
481 gatgcctcc actggggggc gcaagaagc gtttccacg ttgcctccc acctgaccgc
541 cattaccatt ttccatggga ctatcattt cctctactgt gtccctaact caaaagttc
601 atggctcatg gtcagggtga ctttgtctt ttacacagtgt ttcatcccc (SEQ ID NO:39).

OR28

10 LOCUS AF127841 659 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA75 pseudogene, partial sequence.
ACCESSION AF127841
KEYWORDS .
SOURCE common gibbon.
15 ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 659)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 659)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..659
30 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>659
/gene="HLA75"
/pseudo
35 BASE COUNT 123 a 178 c 143 g 215 t
ORIGIN
1 cttgcctgac atcggttca ccaccaccac ggtccccc gag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct aggcaggccg cctgactcg atgtctctt ttgcatttt
121 tggaggcattg gaagagagac atgctctgaa gtgtacggc ctatgaccgg tttagctta
40 181 tctgtcaccc ttatatcat tcagccatca tgacccgtt ttctgtgac ttccatgttt
241 tttttttttt ctcagttttt tcgactccca gtcacacaac ttgattgtt
301 tgctaatgac ttgttcaag gatgtggaaa ttcttaattt ctctgtgac ctttctcaac
361 tccccatct tgcatgtgt gacagcatca ccaataacgt catcatgtat ttccctgt
421 ccgtatttgg ttccctccc atctggggc cccttttc ttgtataaa atcttttct
481 ccattctgag gtttcatca tcagggtggaa ggtataaagc ctctccacg ttgggtctc
541 acctgtcagt ttgttgcgtga ttgtatggaa gaggtgttgg agggtacctc agttcagggt
601 tgtcatctc cccagaaaag ggtgcagtgg ctcagtgtat gtacacgggt gtcaccccc (SEQ ID NO:40).

OR29

50 LOCUS AF127842 662 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar HLA8 pseudogene, partial sequence.
ACCESSION AF127842
KEYWORDS .

0972455 = 432400

SOURCE common gibbon.
ORGANISM *Hylobates lar*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; *Hylobates*.
5 REFERENCE 1 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
10 REFERENCE 2 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
15 FEATURES Location/Qualifiers
source 1..662
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>662
/gene="HLA8"
/pseudo
20 BASE COUNT 124 a 178 c 143 g 217 t
ORIGIN
1 gtcacactgac gtccgtttca cctccaccac ggtccccgag atgattgtgg acacccattc
61 tcacagcaca gtcatctctt aggcaggctg ctgtactcg atgcctctct ttgccattti
121 tggaggcatg gaagagagac aagctcctga gtgtgtatggc ctatgaccgg tttagccca
181 tctgtcaccc tctatatcg tcagccatca tgaatccgtt ttctgtggc tacctagttt
241 ttttgtctttttttttc ttccgactcg tttagactcc cagctgcaca acttgattgc
30 301 ctgtctaattt acctgttca gggatgcggaa aattccataa ttcttcgtt acccttcata
361 actccccat ctgtcatgtt gtgacaccctt caccataaac ataatcatgtt tattttttt
421 ctgccccattt tggtttttttccatctcg ggaccctttt ctctttctgtt aaaaattttt
481 cctccgttctt gagggtttca tcgtcaggta ggaagtataa agccttcacc acctgtgggt
541 ctcacactgtc agttgttgc tgatgttatg gaagaggcgat tggagggtac gtcagttcag
601 atgtgttttc ttcccccaga aagggtgcag tggccctcagt gatgtacatg atggteacc
661 cc (SEQ ID NO:41).

OR30

40 LOCUS AF127843 662 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO1 pseudogene, partial sequence.
ACCESSION AF127843
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
45 REFERENCE 1 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
50 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 662)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..662
5 /organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>662
/gene="GGO1"
/pseudo
10 BASE COUNT 127 a 180 c 135 g 220 t
ORIGIN
1 cttagactgac atccggttca cctccaccac agtccccaaag atgatttgcc acatccaggc
61 tcacagcaga gccatctcct atgcacgctg cctgactcag atgtctctt ttgccatttt
121 tggaggcatg gaagagagac atgcctctga gtgtatggc ctatgaccgg ttgttagcca
15 181 tctgtcaccc tctgtatcgat ccagccatct tgaacccctg ttctgtggc ttcttagatt
241 cgttgtccct gttttttttt ttttttcctc agtcttttag actcccaatgc gcacaacttg
301 attgccttac aaatgacatcg ctcatggat gtggaaattc ctaatttctt ctgggaacct
361 tctcaactcc cccatcttgc atgtgtgac accttcacca ggaacatcaa cctgtatttc
421 cctgtgtgeca tattttttt tttttccatc tggggaccc tttttttttataaaaatt
481 gtttcctcca ttctgaagggt ttcatcagggt gggaaagtata aaccccttcgc gcctgtggtt
541 ctacacgttc atgtgtttac tgattttagt gaacaggcgt tggagggtagt ctcgggttcag
601 atgtgtcatc ttcccccaga aagggtgcag tggcctcagt gatgtacacg gtggtcaccc
661 cc (SEQ ID NO:42).

25 OR31

LOCUS AF127844 650 bp DNA PRI 28-FEB-2000

DEFINITION Gorilla gorilla GGO17 pseudogene, partial sequence.

ACCESSION AF127844

30 KEYWORDS

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

35 REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

40 REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

45 FEATURES Location/Qualifiers

source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO17"
/pseudo

50 BASE COUNT 129 a 170 c 137 g 214 t

ORIGIN

1 ttttgcgtac ctctgtttta cctccacgac tgtcccaaag atgttactga atatactgac

5 61 acagaacaaa ttccataacat atgcaggctg ttcggcgtatccat
 121 ttggatgcgtt ggacaattta ctcttgactg tgatggccta tgaccgcgtt gtggccatct
 181 gtcacccctt gcactatacg gtcatcatga acccccgctt ctgtggactg ctggttctgg
 241 gtcctgggtt catcagtgatc atgggtccc tgctcgagac ctgtactgtt tgaggctgt
 301 cttctgcac caaaatggaa attccacact tttttgtga tcttcttgaa gtcctgaagc
 361 tcgcctgttc tgacacccctt attaataacg tggtgatata ctttgcactt ggcgtccctgg
 421 gtgtgattcc ctcaactgga atattttctt cttaactataa aatgttttctt ctataactga
 481 ggattccctc agctgggaga aagcacaagg cgtttccac ctgtggttcc cacccctcag
 541 tggcacctt gtttatggc accggcttgggtctatct cagtctgca gccacaccaat
 601 ctcttaggac aagtctgggtt gcctcgtga tgtacaccat ggtcaccaccc (SEQ ID NO:43).

OR32

15 LOCUS AF127845 649 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO18) gene, partial cds.
 ACCESSION AF127845
 KEYWORDS
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 25 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 30 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Gorilla gorilla"
 35 /db_xref="taxon:9593"
 gene <1..>649
 /gene="GGO18"
 CDS <1..>649
 /gene="GGO18"
 40 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHNKVITYAGCITQMCFLLFVG
 NFLLTVMAYDRFVAICHPLHYMVIMNPQLCGLLVLA
 WIVGVLSMLQSLMVLPLPFC
 THMEIPFFCEINQVVHACSDTFLNDIVMYFAVALLGGGPLNGILYSYSKIVSSIRA
 45 ISSAQGKYKAFSTCASHLSVVSLFYGTCLGVYLSSAATHNSHTGAAASV
 MYTVVTP" (SEQ ID
 NO:44).
 BASE COUNT 136 a 172 c 134 g 207 t
 ORIGIN
 50 1 ctccgttagac atctgttttgc tctctaccac tgcggcgtatccat
 61 acacaacaaa gtcacccat atgcaggctg catcacccat atgtgccttt tcttacttt
 121 tggatgcgtt gataacttcc ttcttgaccgtt gatggcctat gaccggtttg tggccatct
 181 tcaccctctg cactacatgg tcattatgg ccctcaactt tgcggactgc tggttctggc
 241 gtcctggatc ttgggtgttc tgaattccat gttacaaagg ttaatgggtt tgccactgcc
 301 ctcttaggac aagtctgggtt gcctcgtga tgtacaccat ggtcaccaccc

361 tgccgttct gacaccttc ttaatgacat agtgatgtat ttgcagtag cactgctgg
421 cggtggccc ctcaatggg tcctgtactc ttactctaag atagttccct ccatacgatgc
481 aatctcatca gtcaggaa agtataaggc atttccacc tgtcatc acctctcagt
541 tgctccta tttatggta catgttgg gggttaccc agttctgctg caaccacaa
5 601 ttcacacaca ggtgctgcag ctcagtgat gtacactgtg gtcacccccc (SEQ ID NO:45).

OR33

LOCUS AF127846 649 bp DNA PRI 28-FEB-2000
10 DEFINITION Gorilla gorilla olfactory receptor (GGO19) gene, partial cds.
ACCESSION AF127846
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla
15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
20 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
30 gene <1..>649
/gene="GGO19"
CDS <1..>649
/gene="GGO19"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
TFLLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHVLLMKRLTFS
TGTEIPHFFCEPAQVLKVACSNTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
35 40 TSSTKGKYKAFSTCGSHLCVVSLFYGTGLGVYLSSAVTHSSQSSMASVMYAMVTP" (SEQ ID
NO:46).
BASE COUNT 118 a 189 c 144 g 198 t
ORIGIN
45 1 ctttgtggac atctgttca tctccaccac agtccccaaatgctgtga acatccaggc
61 acggatcaaa gacatctctt acatgggtt ctcacttcgtatggatttt taatgtatgtt
121 tgctggatgt gatactttcc tactggctgt gatggcctat gaccggtttggccatctg
181 ccccccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
241 atctggtttccatcttcgtt ggttcatgtt ctactgtga agagggttgc
301 ctctccaca ggcactgaga tccgcattt ctctgtgaa cccggctcagg tcctcaagggt
361 ggcctgcctt aacaccctcc tcaataacat tgcgttatgtt gttggccacgg cactgctgg
421 tgcgtttccctt gtagctggaa tcccttttc tcaacttcgtt attgttccctt ccttaatgag
481 aacgtccctcc accaaggaa agtacaaaccc ctttccacc tggatc acctctgttgc
541 ggtctccctt tctatggaa caggacttgg ggtctatctg agttctgttgc tgacccatgt
601 ttcccaagac gactccatgg ctcagtgat gtacgccc gtcacccccc (SEQ ID NO:47).

OR34

LOCUS AF127847 649 bp DNA PRI 28-FEB-2000
5 DEFINITION Gorilla gorilla olfactory receptor (GGO2) gene, partial cds.
ACCESSION AF127847
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Gorilla gorilla"
25 /db_xref="taxon:9593"
gene <1..>649
/gene="GGO2"
CDS <1..>649
/gene="GGO2"
30 /codon_start=2
/product="olfactory receptor"
/translation="FVDICVTSTVPKTLSNIRTQSKVITYAGCITQMYFFILFVVLD
SLLLTVMAYDRFVAICHPLHYTVIMNSWLCGLLVLSWIVSILCSPLQSIMALQLSFC
TELKIPHFFCELNQVVHLACSDTFIKDMMMNFTSVLLGGGCLAGIFYSYFKILCCICS
35 ISPAQGMNKALSTCASHLSVVSFYCTGVGVYLSSAATHNSLSNAAASVMYTVVTS" (SEQ ID
NO:48).
BASE COUNT 146 a 166 c 129 g 208 t
ORIGIN

1 cttttagac atctgttta cttccaccac agtcccaaag acactgtcaa acatccggac
40 61 acagagcaaa gtcacacct atgcagggtt catcacccag atgtacttt ttatacttt
121 tgtagtgttg gacagttac tcctgaccgt gatggcctat gacgggttg tggccatctg
181 tcacccccctg cactacacag tcattatgaa ctccggctc tggactgc tggttctgg
241 gtctggatc gtgagcatcc tttttctcc ttatggcat tgcagctgtc
301 cttctgtaca gaattaaaa tccctcattt ttctgtgaa cttaatcagg tgcaccc
361 tgcctgttct gacacttta ttaagacat gatgtaat ttacaagg tgcgttgg
421 tggggatgc ctcgctggaa tattttactc ttactttaag atactttgtt gcatatgtt
481 aactcacca gtcaggaaa tgaataaagc acattccacc tgcacatctc acctctcagt
541 tgcctcccta ttttattgtt caggcgttgg tgcgttccca agtctgtca caaccataa
601 ctcaacttca aatgtcgat ctcgttgg tgcaccc (SEQ ID NO:49).

OR35

LOCUS AF127848 649 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO3) gene, partial cds.

ACCESSION AF127848
 KEYWORDS
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 5 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 10 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 20 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>649
 /gene="GGO3"
 CDS <1..>649
 /gene="GGO3"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDTSFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
 TFLLAVMAYDRFAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHILLMKLTFS
 TGTEIPHFFCEPAQVLKVACSNLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
 25 TSSTEGKYKAFSTLWISLCVVSLFYGTGLGVYLSSAVTHSSQSSMASVMYAVVTP" (SEQ ID
 NO:50).
 BASE COUNT 117 a 194 c 143 g 195 t
 ORIGIN
 30 1 ctttgtggac accctttca ttcacccacc agtccccaaag atgctagtga acatccaggc
 61 acggatcaa aa gacatctcct acatgggttg ctcactcag gtgtatttt taatgtatgtt
 121 tgctggaaatg gatactttcc tactggccgt gatggcttat gaccggtttg tggccatctg
 181 ccacccctcg cactacacgg tcatcatgaa cccctgcctc tgtggccctcc tggctctggc
 241 atctggtttc atcattttct ggttctccct ggttcatatt ctactgtatgaga agaagtgtac
 301 ctttcacaca ggcactgaga ttccgcattt cttctgtgaa cccggttcagg tcctcaagggt
 361 ggcctgcctc aacacccctcc tcaataacat tgcgttat gttggccacgg cactgctggg
 421 tggttttctc gtagctggga tcctcttc tctacttcag attgttcct ccttaatgag
 481 aacgtcctcc accgaggggca agtacaaacg cttttccacg ctgtggatct ccctctgtgt
 541 ggtctccttg ttctatggaa caggacttgg ggtctatctg agttctgtg tgacccactc
 601 ttcccagagc agtccatgg cctcactgtat gtacggcgtg gtcacccccc (SEQ ID NO:51).
 35
 40
 45
OR36
 LOCUS AF127849 650 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla GGO4 pseudogene, partial sequence.
 ACCESSION AF127849
 KEYWORDS
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
5 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
/organism="Gorilla gorilla"
15 /db_xref="taxon:9593"
gene <1..>650
/gene="GGO4"
/pseudo
BASE COUNT 134 a 164 c 132 g 220 t
20 ORIGIN
0 1 ctggctgag attggttca ttcggcgc ggtcccaag atgatcggtt acatgcagtc
0 61 acatagcaga gtcatctcct atgcgggccg cctgacacag atgtcttct ttgccttt
4 121 tcatgtatg gatgacatgc tccggactct gatggcctat gaccgatttg tgccatctg
2 181 tcacccctg cactaccag tcatcatgaa tcctcaccc tggatgttct tagttttgt
4 241 gccttttc ctagcctgt tggatccc gctgcacagc tggatgtgt tacaattcac
2 301 ttgcctcaag aatgtggaaa tatctaattt ttatgtat ccattcaac ttctcaaact
4 361 tgactgttct gaacagtgtc atcaatagca tattcacata ttagatagt actatgttg
2 421 gttcccttc catttcaggg atcctttgt cttaatata aattgtcccc tccattctaa
4 481 gaattccatc gtcatgtggg aagtataaag ccctctccac ctgtggctct cacctgtcag
2 541 ttgttgttctt atttatggaa ataggcattt gctgttaccc gacttcagct gtgtcaccac
30 601 cacccagggaa tgggtgggtt gcatcagtga tctacgggtt ggtcaccaccc (SEQ ID NO:52).

OR37

35 LOCUS AF127850 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO70 pseudogene, partial sequence.
ACCESSION AF127850
KEYWORDS
SOURCE gorilla.
40 ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650

/organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>650
 /gene="GGO70"
 /pseudo
 5 BASE COUNT 128 a 170 c 134 g 218 t
 ORIGIN
 1 ctggcctgac atcggttca cttccaccat ggccccaa atgattgtgg acgtccaatc
 61 tcacaggcagg ttcatctctt atgcaggctg ctcactcgat atatctctt ttgcatttt
 10 121 tggggcatg gaagagagac atgcctcta gtgtatggc ctatgaccgg ttgttagcca
 181 tctgtcaccc ttatatacat tcagccatca tgaacccgtg ttctgtggc ttcttagatt
 241 tgcgtctt ttttcttc ttttctcg tcttttagat ggtcagctgc agaacttgat
 301 tgcctacaa atgacctgtc tcgaggatgt gggaaatccct aatttcctt gtgacccttc
 361 tcaactgcc catctcacat gtgtgacat cttcaccaat cacataatca tgtatccc
 421 tgctgcccata ttgggtttc ttccatctc ggggaccctt ctcttaccat atgtatgt
 481 ttccatctt ctgagggtt catcatatat gggagggtta aagcttccc cacctgttag
 541 ttgttgctg atattatgga acaggctcg gagggatctt cagttcagat gtgttatctt
 601 caacaagaaa ggctcgagtgcctcgtga tgtacacggg ggtcacgccc (SEQ ID NO:53).

OR38

LOCUS AF127851 649 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO71) gene, partial cds.
 ACCESSION AF127851
 25 KEYWORDS
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 30 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 35 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
 Montpellier Cedex 5 34396, France
 40 FEATURES Location/Qualifiers
 source 1..649
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>649
 45 /gene="GGO71"
 CDS <1..>649
 /gene="GGO71"
 /codon_start=2
 /product="olfactory receptor"
 50 /translation="FADLCFTSTVPKMLLNILTQNKFITYAGCLGQIFFTSFGCLDNLLTVMAYDRFVAICHPLHYTVIMNPRLCGLLVLSWCISVMGSLETLTVRLSFTKMEIPHFFCDLLEVLKACSDTFINNVVIYFATGVLGVIPFTGISSYYKIVFSILRISSAGRKHAFSTCGSHLSVVTLFYGTGFGVYLSSAATPSSRTSLAASVMYTMVTP" (SEQ ID NO:54).

181 tcatcctctg agatacgcgg tcatacatgaa ctttcgtctc tggggcttct tgatcccttt
241 gtcctgtct attagcatca tggacaccct gctccacgat ctgtatggct tgcggctgtc
301 cttctgcaca cacctggaga tacccttctt ctctcgag gtgtgcaag tcatcaagct
361 tgcgttct gataccctca tcaataacct ctgtatataat ttgcagctg gcgtgtggg
421 aggtgttctt ctgtctggaa tcatatctc ttataactcg atggctctt ctgttttag
481 aatggcatca gcaagtggaa agtataaagg ttttccacc tggctctc accttcgggt
541 tggctcttgc tctacggga cagggttggg ggtgtacatc agttctgcgt ttatgcactc
601 tcccaggacg atggcagtgg cttaaatgtt gtacacgggtt gtcactccc (SEQ ID NO:57).

10 **OR40**

LOCUS AF127853 645 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU36 pseudogene, partial sequence.
ACCESSION AF127853
15 KEYWORDS
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
20 REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
25 REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted.(17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
30 FEATURES Location/Qualifiers
source 1..645
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>645
/gene="EFU36"
/pseudo
BASE COUNT 118 a 189 c 138 g 200 t
ORIGIN

1 ctttgctgac gtctgttca cttccaccac ggtggccaaag atgttagtga acatccaggc
40 61 gcacagcaag gccatcacat acaaaggctg cttcacccag atgtgtttt tcttgatttt
121 tggggctactt gtttctactt gacgggtatg gctatgacc gtttcgtgg catctgtcac
181 cccctgcgtt acatggcatc catgaaccccc aggctctgtt gtcctctgtt tctcccttct
241 tggttatctt gcttgcgtt ttcctgtgtt caaaatgttga tggtttgag ggtgtccctt
301 tgccaagaaa tagaaatccc ccactacttc tggtaacttgc ctcagatctt cacgctcgcc
361 tgctctgaca cccttagttaa tggacttgc ttttgcgtt ttttgcgtt gtttgcgtt
421 attccctgtt ctggatctt ttatctttat tccagaattt tccctccat aatgtgcatt
481 tcctctgtt gggggatgaa caaaggctttt tccacccgtt ggttcaccc tccctgttgc
541 tcctgttctt acggtaacagg ctttgggttcc tacctaattt ctgaaacagg ccaggcccttcc
601 agaagggtt caatgcctt ggtgtatgtt accatggta ccccc (SEQ ID NO:58).

50 **OR41**

LOCUS AF127854 647 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus EFU37 pseudogene, partial sequence.

ACCESSION AF127854
KEYWORDS
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
5 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
10 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 647)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..647
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
gene <1..>647
 /gene="EFU37"
 /pseudo
20 BASE COUNT 118 a 192 c 141 g 196 t
ORIGIN
1 ctttgtgac atctgttca ctcaccac catcccaag atgactgtgg acatcctaac
61 tcacagcaga gtcatctcct ctgggggctg tctgaccag atgtctcttg ctctgccttt
121 tgggtgtgt gatgatatgc ttctgaccgt gtcggcctgt gacccgttggccatctg
181 ccacccccctg cactacacgg tcatcatgaa ccccccactt tggccctcc tgggtctgat
241 atcttggttc atcatgtccc ttgttgcctt ggttcaccc tcaactgataa ggaggctgac
301 attccccagg gccacagaaa tcccacatta ctctgtgaa ctggctcaaa ttctcaaagt
361 gccccactt gacagcttca tcaataacat ctccctgtac ttgtcggtgt tggtctggg
421 tgggttccc atcacaggga ttctctactc ctactctaaa attgtctcct ccgtaatgag
481 gatgtcgcc actcgaggca agaagaaagc atttccacc ttgtgggttc atttggtgtgg
541 tctgttgtt ctatggaaaca gggcttgggg tctaccttag ctctgtgtg acccccttctt
601 cccagagcag cagcattgcc tcagtgatgt actcggtggt caccccc (SEQ ID NO:59).

OR42

40 LOCUS AF127855 652 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU38 pseudogene, partial sequence.
ACCESSION AF127855
KEYWORDS
SOURCE Eulemur rubriventer.
45 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
50 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

5 source 1..652
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>652
/gene="ERU38"
/pseudo

10 BASE COUNT 124 a 191 c 136 g 201 t

ORIGIN

1 ctttgttgc atctgtttca ctcaccac catccccaaatgctggta acattgacac
61 acacagcaaa gacatctct acgtggatg cctactcg atgtatTTT tcatgggtt
15 121 tggggactg gacaacttcc tcctgaccgt gatggctgtgacccgttggccatctg
181 tcacccctgc cactatcgac tacagtcatc atgaaccccc gcttctgtgc ctcctgggt
241 ctgatgtttt ggttcatcat gtccctggat gccctgggtt atgttctact tatactgagg
301 ctgacccccccttagaaac taaaatccca cattttcttgcacccgc tcaatgc
361 gaggtggccc getctgacac ctttataaat aacatctgt tgacttggtt ggctgtgtt
421 ctgtatgtttt cctgtcacgg ggatccctta ccctactctt aaaaattgtct ctccttaat
481 gaggatgtcc tccactcgac gcaagaagaa agcatttcc acctgtgggtt ctcacccctc
541 tgggtccctc ttgttctatg gaacaggact tggggtctac ctaagtctg ctgtgacccc
601 ttctcccaag agcagcgcca ttgcctcagt gatgtacaca gtagtcaccc cc (SEQ ID NO:60).

25 OR43

LOCUS AF127856 648 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU39 pseudogene, partial sequence.

ACCESSION AF127856

30 KEYWORDS

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.

35 REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

40 REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

45 FEATURES Location/Qualifiers

source 1..648
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>648
/gene="ERU39"
/pseudo

50 BASE COUNT 132 a 173 c 141 g 202 t

ORIGIN

1 cttgcagac atctgttttgc tgcaccac tgcctcaggatg atgtgaatg tgcagacatg

5 61 gagcaaagtc atatcctaca caggctgcat cacccagatg gacttttct tgctcttgt
 121 aggactggac aacttcctcc tgaccgtat ggcctgtac cggtttgcc ccatctgtca
 181 ccccctgcac tatgcagtagt agtcatcatg aaccccaggg tctgtgcatt tctgttctg
 241 gtttctgaa tcctgagtagt cctgaattcc ttgttacaaa gcttaatggt gttcagata
 301 accttctgta cagactggaa aatccccac ttttctgtg aacttaatca gataatccac
 361 ctggctgtt tggacacccctt tcctaattgac atggtagt attggcagt gatgctgtg
 421 ggtgggggggt gcctactgg gatccttac tcctactcta agatagttt ccggctacgt
 481 gcaatctctt cggttcaggaa gaagtataaa gcattttcca cctgtgcac tcacccctcg
 541 gtcgtctctt tattttatg tacatgccta ggggtgtacc tcagttctgc tacacacaac
 10 601 tcacactcca gcgcaacaggc ctgggtatg tacacgggg tacactccc (SEQ ID NO:61).

OR44

15 LOCUS AF127857 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU40) gene, partial cds.
 ACCESSION AF127857
 KEYWORDS
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 25 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Eulemur rubriventer"
 35 /db_xref="taxon:34829"
 gene <1..>649
 /gene="ERU40"
 CDS <1..>649
 /gene="ERU40"
 40 /codon_start=2
 /product="olfactory receptor"
 /translation="LSDICFTSTTIPKMLVNLHAHSKDISYRECLTVYFFMIFAGLD
 NFLLTVMAYDRFVAICHPLHYMVIMNPRFCALLVLMSWFIMSLVALVHVLLILRLTFS
 LETEIPHFSCEVAQILKVARSDTFFNNICLYLSAVLLGVFPVMGILFSYSKIVSSLMR
 45 MSSTS AKNKA FSTCGSHLCVVSLFYGTALGVYLSSA VTPSSQSSAIASV MYTVVTP" (SEQ ID
 NO:62).
 BASE COUNT 119 a 187 c 131 g 212 t
 ORIGIN
 50 1 ctttctgac atctgttca cctctaccac catccaaag atctggta acctcacgc
 61 acacagcaaa gacatctcc acagggagtg cctcactcg gtgtatttt ttatgatttt
 121 tgctggactg gataattcc tcctgaccgt gatggcatt gaccggtttggccatctg
 181 ccacccctcg cactacatgg tcatcatgaa tccccgttc tggccctcc tggttctcat
 241 gtcttgggttc atcatgtctc tgggtccctt ggttcatgtt ctacttatg tgaggctgac
 301 ttttcctta gaaactgaaa tcccacattt ctctgtgag gtggctcaga ttctcaaggt

361 ggcccgctct gacacccttct tcaataacat ctgcttatac ttgcggctgt tggtgctggg
421 tgtgtttccc gtcatgggaa tcctcttc tctactctaaa attgttcat ccttaatgag
481 gatgtcctcc acttcagcaa agaataaagc atttccacc tggtggtctc acctctgtgt
541 ggtcttcttg ttctatggaa ctgcacttgg ggctcacctc agctctgttg tgaccccttc
601 ttccccagagc agccgcattg cctcagtgtat gtacacggtg gtcacccccc (SEQ ID NO:63).

OR45

LOCUS AF127858 648 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU56 pseudogene, partial sequence.
 ACCESSION AF127858
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 648)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 648)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..648
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>648
 /gene="EFU56"
 /pseudo
 BASE COUNT 131 a 180 c 142 g 195 t
 ORIGIN
 1 cttagatc atctatattg tcttaccac ggtcccaaag atgttgta atatcaagac
 61 acacagcaaa gccatatctt acgcaggctg tgcaccccg atgcactttt gcataacgtt
 121 tgcatgtatc gcatcttcctt cctgactgtt atggctatgt actggttgg gcccacatgt
 181 cacccttcgc actatgtgtt catcatgaac cccaggctt gtgcactgtt tttctgttg
 241 tcctggatca ttagtgcctt gaattccctt tgccaaatgtt taatggttt gccaactcccc
 301 ttctgtgcac agttggaaat ccccccaggat ttctgtgaac ttaatcgat aatcccttc
 361 ggcgttcttgc acaccctttaatgtacgtt gtgttgtt tggcagctat gctactgggt
 421 gaggggttgc ttactgggtt ctttactctt tactctaaga tagtttcctt cgtacgtgc
 481 atctcttcgg ctcaggggaa gtataaagca tttccacat gtgcacatcata cctctcggtt
 541 gtctccat tttactgcac aaggctcggtt gtgtacgtt gctctgtt tacacacaac
 601 tcacactcca ggcacacaggc ctccgggtatc tacacgggtt tcaactcccc (SEQ ID NO:64).

OR46

50 LOCUS AF127859 643 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU57) gene, partial cds.
ACCESSION AF127859
KEYWORDS .
SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 643)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 643)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 15 source 1..643
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>643
 /gene="EFU57"
 20 CDS <1..>643
 /gene="EFU57"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFVSTTVPEMLNVQTWSKVISYTGCITQMDFLLFVG LDN
 FLLTVMAYDRFVAICHPLRYAVIMNPRLCVFLVLWSILSVLNSLSQSLMVLRLTFCT
 DLEIPHFFCELNQIHLACSDTFLNDVVMYLA VMILLGGGCLTGILYSYSKIVSSVRAI
 SSAQGKCKAFSTCASHLLVVSLFYCTCLGVYLSSATHNSHSSATASVMYTVVTP" (SEQ ID
 NO:65).
 25 BASE COUNT 127 a 171 c 143 g 202 t
 ORIGIN
 30 1 cttgcagac atctgtttg tgtccaccac tgcccagag atgctgaatg tgccagacatg
 61 gagcaaagtcc atatcttaca caggcgtcat cacccagatg gacttttct tgcttttgt
 121 aggactggac aaccttcctcc tgaccgtatg ggcctatgac cggtttgtgg ccacatgtca
 181 cccctgtcgcc tatgcgtca tcatgaaccc caggetctgt gtattttcttg ttctgggtgc
 241 ctggatcctg agtgtcctga attccctgtc acaaagctta atgggtgtgc ggctaaccctt
 301 ctgtacagac ttggaaatcc cccactttt ctgtgaacctt aatcagataa tccacccctgc
 361 ctgttcggac acctttctta atgacgtgtt gatgtatgg gcagtgtatgc tgctgggtgg
 421 gggatgcctt actggatcc ttactctta ctctaagata gttccctccg tacgtcaat
 481 ctccctcgct cagggaaagt gtaaaggcatt ttccacctgt gcatctcacc tcttgggtcg
 541 ctcccttattt tattgtacat gccttaggggt gtactttgatgtctacac acaactcaca
 601 ctccagcgcac acaggcctcggtatgtacac ggtggacttccc (SEQ ID NO:66).

OR47

45 LOCUS AF127860 644 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer ERU66 pseudogene, partial sequence.
 ACCESSION AF127860
 KEYWORDS
 SOURCE Eulemur rubriventer.
 50 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 644)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 644)
5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
10 source 1..644
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>644
/gene="ERU66"
15 /pseudo
BASE COUNT 113 a 191 c 145 g 195 t
ORIGIN
1 ctttctgac atctgttca ctccgcac catcccaaag atgctgtgga gcatccggc
61 acagagcaaa tcatacaccc gtgcggctg ctcacacag atgtactgtt tcattggctt
121 tggacttctg gacaatctga tgctgtatgtt catggcttat gaccacttg tggccatctg
181 tcaccctctg cactacacag tcatcatgaa cccagtgtc tgtgtccagg tgcttgtcca
241 caccgggctt gtcagcatcc tgggggcctt cctcgagag tgaccgtgtt gggcttctt
301 ttggtgact cactgaaatc ccacactatt tctgtgagct ccctgaggct tcctagctct
361 cccactctga cccctccatc aataatgtca tattatacat ttttgacgggt tcattggctt
421 ctttccttctt gctgagattt ttctccaact ttcttctgtt gtttttctg tcctgaggat
481 ctcaacagca ggggggaagt ataaaatgtt ttccctctgtt gagtctcacc ttcgggttgt
541 ctgcctgttc tggggaccc gcctgggtc tagctcaggccatggac acacgcttct
601 ccgacagggg tttgcctcg gtccatata ctgttagtcac cccc (SEQ ID NO:67).

30 OR48

LOCUS AF127861 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU67) gene, partial cds.

ACCESSION AF127861

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.

40 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

45 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..649
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>649

00747455
00747456
00747457
00747458
00747459
00747460

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CDS      /gene="ERU67"
          <1..>649
      /gene="ERU67"
      /codon_start=2
      /product="olfactory receptor"
      /translation="FMDICFTTVIPKMLVNFLSETKAISYVGCLVQMYFFMALANTD
SYLLASMAIDRLVAICKPFHYDVVMSPRRCLLGSCTISHLHSLFRVLLMSRLSFC
ASHIIKHFFCDTQPVLKLSCSDTSSSQIVVMTELAVITPFLCIIFSYLRIITVLA
IPSAAGKWKAFTCGSHLTVVVLFYGSVIYYFRPLSMYSVMKDRVATVMYTVVTP" (SEQ
5
10 ID NO:68).
BASE COUNT 119 a 200 c 141 g 189 t
ORIGIN
1 ttcatggat atctgcttca caacagtcat tgtgccaaag atgctggta attcctgtc
61 agagacaaag gccatctct atgtggcgtc tctggccatc atgtacttct tcatggccct
15 121 tgc当地 act gacagctacc tactggcc tc catggctatt gacccggctgg tggccatcg
181 caaaccccttc cactatgatc tggttatgag cccacggcgt tgc当地 ctca tgctgtgg
241 ttctgcacc atccccacc tacactccct gttccgggtg tctactcatgt ctgcctgtc
301 ttctgtgtcc tcccacatca ttaagcactt ttctgtgtat acccaggctg tgctaaagct
361 ttccctgtct gacacatctt ccacccatgt tggtgtatc acggagaccc tggctgtcat
421 ctgtgacccccc ttctgtgtca tcatcttctc ctatctgaga atcatcatca ctgtgctcgc
481 aatccccctct gcagccggga agtggaaaggc ctctccacc tggctccc acctcactgt
541 ggtggccctg ttctatggca gtgtcatcta tggatattc aggccccctgtt ccatgtactc
601 agtcatgtatc gaccggtagt ccacagttt gtacacggta gtgacacct (SEQ ID NO:69).

25 OR49

LOCUS AF127862 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU83) gene, partial cds.
ACCESSION AF127862
30 KEYWORDS
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
35 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
40 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>649
/gene="EFU83"
50 CDS <1..>649
/gene="EFU83"
/codon_start=2
/product="olfactory receptor"

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/translation="FSDICLVSTTVPQMLVNQTHSKVISYAGCVTQMDFVLFVGLD
SFLLTVMAYDRVVICHPLHYAVTMNPRLCGLLVLSWIMSALSSLLESLVVLWVCFC
LDLEIPHFFCELNEIIHLACSDTFLIDMVMYFSALLGGGSLAGILYSYSKIVSSVRA
ISSAQGKYKAFSTCASHLAVVSLFYCTSLGVYLSSAATHNSHSSATASVMYTVVTP" (SEQ ID

5 NO:70).

BASE COUNT 119 a 182 c 152 g 196 t

ORIGIN

1 ctttctgac atctgttgg tctcgaccac tgcccacag atgctggta atgtgcagac
61 acacagcaaa gtcataatcct acgcaggctg cgtccccag atggacttct ttgtactctt
10 121 ttagggctg gagacgtcc tccttaccgt gatggctat gaccggtttggtcatctg
181 ccaccactg cactacggcg tcaccatgaa cccaggctc tggggctgc tggtgctgct
241 gtcttggatc atgagtgcgc tgagttcctt gtagaaagc ttatgttgc tgggggttg
301 ctctgtctg gacttggaaa tccccactt ttctgtgaa ctaatgaga taatccacct
361 ggccgttct gacacccatc ttattgacat ggtgtat ttctcagtc tactgctgg
421 tgggggtcc ctggctggaa tcccttactc ttactctaag atagttccct cctgtacgtc
481 aatctctca gctcaggaa agtataaagc atttccacc tggcatctc acctcgccgt
541 tggcccta ttactgca caagccctgg ggtgtactg agtctgtc ctacacacaa
601 ctacactcc agcgaacag cctcggtat gtacacgggt gtcactccc (SEQ ID NO:71).

20 OR50

LOCUS AF127863 642 bp DNA PRI 28-FEB-2000

DEFINITION Eulemur rubriventer EFU84 pseudogene, partial sequence.

ACCESSION AF127863

KEYWORDS

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.

30 REFERENCE 1 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

35 REFERENCE 2 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

40 FEATURES Location/Qualifiers

source 1..642

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

45 gene <1..>642

/gene="EFU84"

/pseudo

BASE COUNT 130 a 180 c 138 g 194 t

ORIGIN

1 ctgttagac atctgttttgc tcttaccat ggtccaaag atgctggta acatcaagac
61 acacagcgtt catatccat gcaggctgtc tcacccagat gcactttcc ataatcttt
121 cagagtttaga catcttcctc ctgacgggtga tggcctatga ccgggtgtgt gccatctgc
181 accccctgca ctacacggcc atcatgaaacc ccaggctctg tgaactgctg tggctggct
241 cctggatcat aagtggcccg aattccctgt tacaatgtt aaagggtgtc tggctgtcct
301 tctgtacaaa ctggaaatc cgtaacttt tctgtgaact tagatactac atctggctg

361 ttgtgacacc tctgttcatg acgtggat acatattgc gctgtggc tggctgttt
421 tcctcttgc gggatccctt actcttactc tcagatagtt tcctccacac gtgcacttc
481 ctcagctcg gcgaagtgt aagcatttc cacctgtca gtcaccccg cggttgtctc
541 tctatttac tgacaagcc tcgggtgt a cttgagctt gctgtacac acaacccaca
5 601 ctccagcgca acagcctcg tgatgtacat ggtggtaact cc (SEQ ID NO:72).

OR51

LOCUS AF127864 652 bp DNA PRI 28-FEB-2000
10 DEFINITION Eulemur fulvus EFU86 pseudogene, partial sequence.
ACCESSION AF127864
KEYWORDS
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 652)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..652
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
30 gene <1..>652
/gene="EFU86"
/pseudo
BASE COUNT 126 a 166 c 152 g 208 t
35 ORIGIN
1 cttgcagac atctgtttt gttccaccac tgtccaaag atgtggta atgtgcagac
61 acagagcaaa gtcataatcc acgcaggctg cgtcacccag atggacttt tcatacttt
121 tgccgggttg gatatctta tgcgtatcat gatggctat gaccgggttg gggccatctg
181 tcacccactg cagtagacccg tcatcatgaa ccccaaggctc tggggctgc tgggtgttgt
40 241 gcccggatc ttgatgtacc tgaattccctt gttacaaaggc ttaatgggt tgcactgtc
301 ctttgtaga cacttggaaa tcctcacttt ttcgtgtaaact ttaatcagggt tgcacccctt
361 gcctgttctg aaaccttctt taatgacatg gtgtatgtc tgatatctgt ggtgtgggt
421 ggtggttccc tggctggac tctttactgc agaatagtt gtcacccatacg
481 tgcaacgtcc tcagctcagg ggaagtataa agcattccc acctgtcat ctcaccccttc
45 541 agttgtctcc ttatcttcc tcacaatccctt aggggtgtac ctcagctcg ctgtaccca
601 gaattcgtgc tagccttgggt ggtgtacacg gttgtactc cc (SEQ ID NO:73).

OR52

LOCUS AF127865 649 bp DNA PRI 28-FEB-2000
50 DEFINITION Eulemur fulvus olfactory receptor (EFU87) gene, partial cds.
ACCESSION AF127865
KEYWORDS
SOURCE Eulemur fulvus.

DRAFT

ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 649)
 5 **AUTHORS** Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 10 **AUTHORS** Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 15 **source** 1..649
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
gene <1..>649
 /gene="EFU87"
 20 **CDS** <1..>649
 /gene="EFU87"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFTSTTIPKMLVNIETHSKDISYMGCLTQMYFFMIFAGLD
 25 NFLLTVMAYDRFVAICHPLHYTVIMSPRCALLVLISWFIMTLVALVHVLILRLTFS
 LETEIPHFFCDLAQILEVAHSDTLINNICMYLSTVLLGVFPVTGILFSYSKIVSSLMR
 MSSTAGKKAFSTCGSHLSVVCLFCGTGVGVYLSSAVTPSSQSSIASVMFTVVTP" (SEQ ID
 NO:74).
 30 **BASE COUNT** 125 a 187 c 134 g 203 t
ORIGIN

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1 ctttgtac atctgttca ctcaccac catccccaaatgctggta acattgaaac
61 acacagcaaa gacatctcct acatggatg ctcacttagt atgtatttt tcatgattt
121 tgctggactg gataattcc tcctgactgt gatggctat gaccggtttg tggccatctg
181 ccacccctta cactacacgg tcatacatgg tccccgttc tggccctcc tggttctat
241 atctggttc atcatgaccc tgggtgccct gggtcatgtt ctactgtat tgaggctgac
301 ctctcttta gaaactgaaa tccccacattt ctctctgtac ctggctcaga ttctcgaggt
361 gccccactct gataaccctca tcaataacat ctgcgtatgtac ttgtcgactg ttgtgtggg
421 cggtttccct gtacacgggta tcccttctc ctactctaaa attgtctctt ccttaatagag
481 gatgtctcc actgcaggca agaagaaagc atttccacc tgggtggctc acctctctgt
541 ggtctgctgttctg caggagttgg ggtctatctc agttctgctgt tgaccccttc
601 ttcccagagc agcagcattt cctcgtatgtat gttcacgggtg gtcacccccc (SEQ ID NO:75).

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OR53

45 **LOCUS** AF127866 646 bp DNA **PRI** 28-FEB-2000
DEFINITION Macaca sylvanus MSY1 pseudogene, partial sequence.
ACCESSION AF127866
KEYWORDS
SOURCE Barbary ape.
 50 **ORGANISM** Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
 source 1..646
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 /gene="MSY1"
 /pseudo
BASE COUNT 115 a 186 c 144 g 201 t
ORIGIN
 1 ctttggtac atctgttta tctccaccac cgccccagg atgctgatga acatccaggc
 61 atggagcaaa gacatctct acgtgggtg cctcaactcg gtgtatttt taatgtatgtt
 121 tgctggaatg gatactttcc tactggccat gatggctat gaccggttt gggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccctgcctc tgccgcctcc tggtctggc
 241 atcttgattc atcattttat gggctccctt agttcatatt ctactgtatga agagtttgt
 301 ctccataggc actgagattc cgcattttt ctgtgaactg gtcagggtcc tcaagggtggc
 361 ccgcctgtat actctccctcg ttaacattgt ctgtatgtt gcccacagcac tgctgggtgt
 421 gctccctgtat gctggatcc tcttccctt ctctcagatc gtcctccctt taatgaggat
 481 gtcctccacc gaggcaagt gcaaaggctt ttccacatgtt gggctcacc tctgtgtgg
 541 ctccctgttc tatggaacag gacttgggtt ctatctcgt tctgctgtga cccatcttc
 601 ccagagecgc tccatggcct cagtgatgtt caccatggtc acccccc (SEQ ID NO:76).

OR54
LOCUS AF127867 649 bp DNA **PRI** 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY12) gene, partial cds.
ACCESSION AF127867
KEYWORDS
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
 source 1..649
 /organism="Macaca sylvanus"

gene /db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY12"
 CDS <1..>649
 /gene="MSY12"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDVCFVSTTPKMLVNIQTQNKVITYAGCISQMCFFIFFAGLD
 IFMLTVMA YDRFVAICHPLHYTVMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
 ADLEIPHFFCELNQVIHLTCSDTFLNDMVMYLSAVLLGGCLIGILYSYSKIVSSIHA
 ISSVQGKYKAFSTCASHLSVVSLFYCTILGVYLSSAATHSSHASA AVSVMYTVVTP" (SEQ ID NO:77).
 BASE COUNT 132 a 173 c 138 g 206 t
 ORIGIN
 15 1 cttcgttagac gtctgtttt tgccaccac tgccccgaag atgctggta acatccagac
 61 61 acagaacaaa gtcacccat atgcaggctg catcagccag atgtgccttt tcataatttt
 121 121 tgaggattt gacatctta tgctgaccgt gatggctac gacagggttg tgcccatctg
 181 181 tcacccctcg cactacacgg tcaccatcaa ccccaggctc tgtggactgc tggttctggc
 241 241 gtcctggatc atgagtggcc tgaatttttc attgcaaaac ttatggtat tgcacccat
 301 301 ctctctgtca gacttggaaa ttccccactt ttctgtgaa ctaatcagg tcatccaccc
 361 361 tacctgttct gacactttt ttaatgacat ggtgatgtat ttgcagctg tgcgtctggg
 421 421 tggggatgtt ctcattggaa tcctttactc ttactctaag atcgtctccct ctatacatgc
 481 481 aatctcatca gtcaggggaa agtacaaggc attttccacc tgcacatctc acctctcggt
 541 541 tgccttta ttatgtta caatctagg tgcgttaccc ttactctgtc caacccacag
 601 601 ctacacgca agtgcgtcag tctcggtat gtacactgtg gttacccccc (SEQ ID NO:78).

OR55

LOCUS AF127868 649 bp DNA PRI 28-FEB-2000
 30 DEFINITION Macaca sylvanus olfactory receptor (MSY16) gene, partial cds.
 ACCESSION AF127868
 KEYWORDS
 SOURCE Barbary ape.
 ORGANISM Macaca sylvanus
 35 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 40 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 45 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 50 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY16"
 CDS <1..>649

DRAFT - 24/12/2000

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5      /gene="MSY16"
      /codon_start=2
      /product="olfactory receptor"
      /translation="LADIGFTSTTVPKMLVNIQAQSNAISYAGCISQMYFFMVFGGID
      TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLSWFLSLSIQLSFC
      TSWVIQHFYCELAQALTACSDTHINYILLYVVTGLLGFPFSGILFSYTQIVSSILR
      ISSTDGKHKAFSNCGSHLSVVFLFYGTGLGVYLSSNASSSWRGMVASVMYTVVTP" (SEQ ID
      NO:79).
10     BASE COUNT    115 a   195 c   140 g   199 t
      ORIGIN
      1 ctggctgac atcggttca cctccaccac agtccccaaag atgctggta acatccaggc
      61 gcagagcaat gccatcagct atgcaggctg catctcccg atgtatttt tcatggttt
      121 tggaggcata gacacatttc tcctcaccgt gatggctat gaccggatg tggccatctg
      181 tcacccctgt tactaccctg tcattatgaa ccccccgcctc tgtggctgc tggttcttg
      241 gctctggttc cttagcttgt catactccct gatccagagt ctgtgtatgc tgcagttgc
      301 ctttgcacc agtgggtca tttagcacattt tactgcggat cttgctcagg ccctcaacgt
      361 tgctgtca gacacacaca tcaattacat cttgcgtctac gtggtgaccg gccttctgg
      421 ttttgtgcctt ttctcaggaa tcctttctc ctacacccaa attgtctctt ccacccctgag
      481 aatctcatcc acagatggga aacacaaagc ctttctaacat tgcggatctc atctgtctgt
      541 ggtttttta ttctatggga caggccttgg tttgttatctt agttcaatg catgtccctc
      601 ttccctggcgg ggcacatgttgc acatgttgc gtcacccccc (SEQ ID NO:80).

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OR56

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25     LOCUS AF127869 647 bp DNA PRI 28-FEB-2000
      DEFINITION Macaca sylvanus MSY2 pseudogene, partial sequence.
      ACCESSION AF127869
      KEYWORDS
      SOURCE Barbary ape.
30     ORGANISM Macaca sylvanus
            Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
            Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
            Macaca.
      REFERENCE 1 (bases 1 to 647)
      AUTHORS Giorgi,D.G. and Rouquier,S.P.
      TITLE The olfactory gene repertoire in primates and mouse: evidence for
            reduction of function in primates
      JOURNAL Unpublished
      REFERENCE 2 (bases 1 to 647)
40     AUTHORS Giorgi,D.G. and Rouquier,S.P.
      TITLE Direct Submission
      JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
            Montpellier Cedex 5 34396, France
      FEATURES Location/Qualifiers
45     source 1..647
            /organism="Macaca sylvanus"
            /db_xref="taxon:9546"
      gene <1..>647
            /gene="MSY2"
            /pseudo
50     BASE COUNT    131 a   173 c   137 g   206 t
      ORIGIN
      1 ctctgttgc gtcgttttgc tgcaccac tgcggtaaag atgctggta acatccaggac
      61 acagaacaaa gtcacacccat atgcaggctg catcagccag atgtgtttt tcatatttt

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121 tgcaggattg gacacctta tgctgaccgt gatggcctac gacaggtttggccatctg
181 tcaccctcg cactacacgg tcaccatgaa ccccaggctc tggactgc tggtctggc
241 gtcgtatca tgagtccct gaattctca ttgcaaagct taatggatt gcaccttcc
301 ttctgtcag actggaaat tccccactt ttctgtgaac ttaatcaggcatccaccc
361 acctgttctg acactttct taatgacatg gtgatgtt tgcagctgt gctgctgggt
421 gggggatgtc tcatggat ctctactct tactctaaga tgcgtcctc tatacttgc
481 atctcatcag ttccaggaa gtacaaggca ttccaccc tgcatactca cctctcggtt
541 gtccttat ttattgtaca atccatggtg tgcacccat ttctgtcga acccacagct
601 cacacgcaag tgctgcagtc tcggatgt acactgttgtt acccccc (SEQ ID NO:81).

10

OR57

LOCUS AF127870 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY4) gene, partial cds.
ACCESSION AF127870
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY4"
CDS <1..>649
/gene="MSY4"
/codon_start=2
/product="olfactory receptor"
/translation="FIDICFVSTTVPKMMVNIQTQSRVITYAGCITQMCFIFVFGLD
IFMLTVMAFDRAVAICHPLHYTVMNPRLSGLLVLASWIMSALNSSLQSLIVRLSFC
TDLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGCGPLSGILYSYSKIVSSIRG
45 ISSAQKYRAFSTCASHLSVVSFLYGTLLGVYFSSAATRNHSSAAASVMYTVVTP" (SEQ ID
NO:82).
BASE COUNT 125 a 179 c 142 g 203 t
ORIGIN
1 ctccatagac atctgttttgcgtccaccat tgcgtccgaag atgtggatc acatccagac
50 61 acagagcaga gtcatcacct atgcaggctg catccccag atgtgcctt tcataattctt
121 tggggactg gatatctta tgctgaccgt gatggccttt gaccggtttggccatctg
181 tcaccctcg cactacacgg tcaccatgaa ccccaggctc agtggggctgc tggttctggc
241 gtcgtatca atgagtgc tgaattctc gttacaaggc ttaatgtgc tgcggcttcc
301 ctctgcaca gactggaaa ttcccaactt ttctgtgaa cttatcagg tggccaccc

361 tgctgttct gacaccttc ttaatgacat ggtagatgtat ttggcatctg cactgctgg
 421 ctgtggccc ctctctggga tcctttattc ttatctaaat atctttccct ccatacgtgg
 481 aactctatca gctcaggaga agtacaggc atttccacc tgtcatctc acctctcagt
 541 tgctcttta tttaggta cgctcctagg agtgtactt agtgtctgt caacccgtaa
 5 601 ctcacactca agtgctgcag cctcggtat gtacaccgtg gttacccccc (SEQ ID NO:83).

OR58

LOCUS AF127871 646 bp DNA PRI 28-FEB-2000
 10 DEFINITION Macaca sylvanus olfactory receptor (MSY6) gene, partial cds.
 ACCESSION AF127871
 KEYWORDS
 SOURCE Barbary ape.
 ORGANISM Macaca sylvanus
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 646)
 20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 646)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..646
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 /gene="MSY6"
 CDS <1..>646
 35 /gene="MSY6"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDFFVTNTIPKMLVNLQSQNKAISYAGCLTQLYFLVSLVALD
 NLILAVMAYDRYVAICPLHYTTAMSPKLCILLSLCWVLSVLYGLIHTFLMTTVFC
 40 GSRKIHYIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIIISYVLIVRAILR
 IPSVSKKYKAFSTCASHLGVVSLFYGTLRMVYLKPLHTYSVKDSVATVMYAVVTP" (SEQ ID
 NO:84).
 BASE COUNT 134 a 196 c 126 g 190 t
 ORIGIN
 45 1 ctcaactgac ctcttcttg tcaccaaac aatccccaaag atgtggtga acctccagtc
 61 ccagaacaaa gccatctct atgcagggtg tctgacacag ctctacttcc tggctccctt
 121 ggtggccctg gacaacctca tcctggctgt gatggcgat gaccgctatg tggccatctg
 181 ctccccccctc cactacacca cagccatgag ccctaagctc tgtatctac tccttccctt
 241 gtgtggtc ttatctgtgc tcatacgccct catacacacc ttccctcatga ccacgggtgac
 301 ctctgtggg tcaagaaaaa tccactacat ctctctgtgag atgtatgtat tgctgaggct
 361 ggcatgtcc gacactcaga ttaatcacac agtgctgtt ggcacaggct gctttatctt
 421 cctcattcccc ttggattca tgatcattc ctatgtgtt attgtcagag ccattccctcag
 481 aataccctca gctctaga aatacaaagc ctctccact tgtgcctccc attgggtgt
 541 agtctccctc ttctatggga cactcgat ggtataccgt aagccctcc atacacttc

601 tgtgaaggac tcagtagcca cagtgtatgtc tgccgggtg acaccc (SEQ ID NO:85).

OR59

5 LOCUS AF127872 649 bp DNA PRI 28-FEB-2000
 DEFINITION Macaca sylvanus olfactory receptor (MSY7) gene, partial cds.
 ACCESSION AF127872
 KEYWORDS
 SOURCE Barbary ape.
 10 ORGANISM Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 649)
 15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 20 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 25 source 1..649
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY7"
 30 CDS <1..>649
 /gene="MSY7"
 /codon_start=2
 /product="olfactory receptor"
 /translation="WVDICFSICIPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
 TLLLTVMAYDRFVAVCHPLHYVTIMNRLCGLLVFVTWLIGVMTPLLHISLLTHLTFC
 KDFEIPHFFCELTHILQLACSDTFLNSTLIYVMTGVLGVPPLLGIIFSYSRASSIRK
 MSSSGGKEKALSTCGSHLSIVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID
 NO:86).
 40 BASE COUNT 129 a 190 c 127 g 203 t
 ORIGIN
 1 ctgggttgc atctgttca gcacatgtcat catcccaag atgctggta acatccagac
 61 caagaacaaa accatcttt acatggactg cctcacccag gtctatattct ccatgtttt
 121 tcctattctg gacacgctac tcctgaccgt gatggctt gaccggttt tgccgtctg
 181 ccacccccctg cactatgtaa ccatcatgaa ccccccctc tgccgcctc tggttttgt
 241 cactggcgtt attgtgtca tgacacccct cttccatatt tctctgtga cgcacatcaac
 301 ctctgtaaa gatttgaaa ttccacattt ttctcgaa ctgacacaca tctccagct
 361 ggcctgctct gatacccttc tgaacagcac gtgtatatat gttatgcacag gtgtgctgg
 421 cgttttcccc ctccctggaa tcattttctc ttattcacga atcgctcat ccataaggaa
 481 gatgttca tctggggaa aagagaaaagc actttctacc tttggctctc acctctccat
 541 cgtttctta ttatggaa caggcatgg ggccatttc acttctgcgg tgactcat
 601 ttcccaaac atctccgttg ctcgggtat gtacacgggt gttacccccc (SEQ ID NO:87).

OR60

LOCUS AF127873 645 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY8 pseudogene, partial sequence.
5 ACCESSION AF127873
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Etheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..645
/organism="Macaca sylvanus"
25 /db_xref="taxon:9546"
gene <1..>645
/gene="MSY8"
/pseudo
30 BASE COUNT 117 a 185 c 142 g 201 t
ORIGIN
1 ctttgttac atctgttta tctccaccac cgtccccagg atgctgatga acatccaggc
61 atggagcaaa gacatctct acgtggggtg cctcactcg gtgtattttt taatgtatgtt
121 tctgttgcata gatactttcc tactggccat gatggctat gaccggtttg tggccatctg
181 ccaccccttg cactacacgg tcatcatgaa cccctgcctc tggccatcc tggccatcc
241 atcttgattc atcattttat gggctccctt agttcatatt ctactgtatga agagttgtat
301 ctccataggc actgagattc cgcattttt ctgtgaactg gtcagggtcc tcaagggtgcc
361 cgcctgtata ctctccctgt taacattgtc ttgtatgtgg ccacagcact gctgggtgt
421 ctccctgttag ctgggatcct ctctccctac ttcagatcg ttcctccctt aatgaggatg
481 tcctccaccc agggcaagta caaaggctt tccacctgt ggtctcacct ctgtgtggc
40 541 tcctgttct atggAACAGG acttggggtc tatctcgat ttgtctgtac ccattctcc
601 cagageagct ccatggcctc agtgatgtac accatggta ccccc (SEQ ID NO:88).

OR61

45 LOCUS AF127874 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY9) gene, partial cds.
ACCESSION AF127874
KEYWORDS .
SOURCE Barbary ape.
50 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Etheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)

DRAFT - 95T241260

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
 JOURNAL Unpublished

5 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

10 FEATURES Location/Qualifiers

source 1..649
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"

15 gene <1..>649
 /gene="MSY9"
 CDS <1..>649
 /gene="MSY9"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LADIGFTSTTPKMLVNIQASNAISYAGCISQMYFFMVFGGID
 TFLLTVMA YDRYVAICHPLYYPVIMNPRLCGLLVLSWFLSLSYSLIQSLLMLQLSFC
 TSWVIQHFYCELAQALTACSDTHINYILLYVVTGLLGFPFSGILFSYTQIVSSILR
 ISSTDGKHKAFTCGSHLSVVFLFYGTGLGVYLSSNASSSWRGMVASVMYTVVTP" (SEQ ID NO:89).

20 25 BASE COUNT 114 a 196 c 140 g 199 t
 ORIGIN

1 cttggctgac atcggttca cctccaccac agtccccaaag atgctggta acatccaggc
 61 gcagagcaat gccatcatcgat atgcaggctg catctcccgat atgtattttt tcatggttt
 121 tggagggata gacacatttc tcctcacctgat gatggctat gacccgtatg tggccatctg
 181 tcaccccttg tactacccctg tcattatgaa ccccccgcctc tgccctgc tggttcttgt
 241 gtccctggttc cttagctgt catactccct gatccagagt ctgttgatgc tgcagttgtc
 301 ctttgcacc agttgggtca tttagactt ttactgcgag cttagctcagg ccctcacgt
 361 tgccctgcata gacacacaca tcaattacat cctgcgttac gtggtagccg gccttctgg
 421 ttttggtcccc ttctcaggaa tcccttttccttacacccaa atttgccttccatccctcgag
 481 aatctcatcc acagatggga aacacaaagc ctttttacc tgccggatctc atctgtctgt
 541 gggtttttta ttctatggga caggccttgg tggatctt agttcaatg catgtccct
 601 ttccctggccgg ggcacatggtgat gtcactgtg gtcacccccc (SEQ ID NO:90).

OR62

40 LOCUS AF127875 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA21) gene, partial cds.
 ACCESSION AF127875
 KEYWORDS
 45 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 649)
 50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"

10 gene <1..>649
/gene="CJA21"

CDS <1..>649
/gene="CJA21"
/codon_start=2
/product="olfactory receptor"

15 /translation="FVDICVTSTTLPKTLSNIQTHSKVITYAGCVTQLYFFVLFIGLD
SLLPTVMAYDRFVAICHPLHYTVIMNPQFCGLLVLVSWIMSALHSLTESLMVYPLLFC
TDLKIPQFFCEIHQIIQFACSDTFLNNLVMLSTVLLGGGAGILYSYSKIASSIRA
ISSAEGKYKAFSTCASHLSVVSLFYCTGLGVYLSSAATHSSLSSAAASVMYTVVTP" (SEQ ID NO:91).

20 BASE COUNT 137 a 184 c 133 g 195 t
ORIGIN

1 ctttgtggac atctgttta cctccaccac acttccgaag acactgtcaa acatccagac
61 acacagcaaa gtcacccacct atgcaggctg cgtaaaaaatccatcg ttgtacttct ttgtacttct
121 cataggggttg gacagcttac tcccgaccgt gatggcttat gaccggtttg tggccatctg
181 tcacccccctg cactacacgg tcatcatgaa ccctcagttc tggtggactgc tggttctgg
241 gcctggatc atgagtggcc tgcattttt gacagaaagc ttaatggat acccaactgt
301 ctttgtaca gacttggaaa tcccccaagtt ttctgtgaa attcatcaga taattcaatt
361 tgccctgttct gacacccttc ttaataacct ggtgtatgtat ttgtcaactg tgccctgg
421 cgggtggccc ctgtggggaa tcctgtactc ttactctaag atagcttctt ctatacgtgc
481 aacttcatca gctgaggggaa agtacaaggc atttccacc tgcacatctc acctctcag
541 tgctcccta ttttattgtt caggcctagg ggtgtacctg agttctgtct caacccacag
601 ctcaacttca agcgcagcag ctcgggtat gtacacagtgtacacccccc (SEQ ID NO:92).

OR63

35 LOCUS AF127876 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA22) gene, partial cds.
ACCESSION AF127876
KEYWORDS
40 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

DRAFT 24/260

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source      1..649
            /organism="Callithrix jacchus"
            /db_xref="taxon:9483"
5          gene      <1..>649
            /gene="CJA22"
            <1..>649
            /gene="CJA22"
            /codon_start=2
            /product="olfactory receptor"
10         /translation="LVDICFTSTTVPKILVNIQEQLSGTISYAGCIAQMYFFMVFGGMD
                  TFLLTVMAKYDRYVAICHPLSYPPVIVNPRLCGLLVLVSWFLSLSIQLSLLMLRLSFC
                  TSWVIQHFYCELAQVLTACSDTHVNYILLYMVTGLLGCVFSGILFSYIQIVSSILR
                  IPSTDGKHAKSTCGSHLSVVSLFYGTGLGVYLSSNASSSWGMVASAMYTVVTP" (SEQ ID
NO:93).
15         BASE COUNT   112 a  193 c  140 g  204 t
ORIGIN
20         1 ctgggttgc atctgttca ctcaccac agtcccaag attctggta acatccagga
61         61 gcagagtgg accatcgct atgcaggctg cattgccag atgtatTTTC tcatggTTT
121        121 tggaggcatg gacacattc tcctcaactgt gatggctat gaccggtaatg tggctatctg
181        181 tcacccctcg tcctaccctcg tcattgtaaa ccccccgcctc tgccgcctgt tggttcttgt
241        241 gtccgtgtc ctcagcttgtc catactccct gatccagagt ctgttgatgc tgccgtatc
301        301 ctctgcacc agtgggtca ttccagcattt ttactgttag ctgtcagg ttctcacgt
361        361 tgccgtctca gacacacatg tcaattacat cctgtctac atggtgaccg gcctctggg
421        421 ctgtgtcccc ttctcaggga tccttttcctc ctacatccaa attgtctctt ccacccctgag
481        481 aatcccatcc acagatggga aacataaaacg cttttctacc tggatctc atctgtctgt
541        541 gggttctta ttctcaggga caggccttgg tggatctt agtccaatg cctcgccctc
601        601 ttctgggtgg ggcatgggtgg cctcagccat gtacacagtg gtcaccct (SEQ ID NO:94).

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OR64

30 LOCUS AF127877 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA23) gene, partial cds.
ACCESSION AF127877
KEYWORDS .
35 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
50 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA23"

CDS <1..>649
 /gene="CJA23"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDICFTTVIVPRMLVNFLSGTKVIPYMGCLVQMYFFMAFGNTD
 SYLLASMAIDRLVAICNPLHYDVAMNPRHCLLMLLGSCSISHLHSLFRLVLLMSHLSFC
 ASHVIKHFCDTQPVLKLSCSDTSSSQMVMTETLAIVTPFLCIFSYLRIIIITVLR
 IPFAAGKWRAFSTCGSHLTVVVALFYGSIYYYYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID
 NO:95).
 5
 BASE COUNT 126 a 192 c 139 g 192 t
 10 ORIGIN
 1 tttcacggat atctgcttca caacagtcat agtgcggcagg atgctggtga attttctatc
 61 aggagacaaag gtttatcccct acatgggctg cctggtccaa atgtactct tcattggcctt
 121 tgggaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
 181 caacccctta cactatgtat tgctatgaa ccccccggcat tgccctactca tgctatggg
 241 ttcttgccgc atctcccaacc tacattccct gtccgggtg ctactttatgt ctacacccgtc
 301 ttctgtgcc tcccacgtca ttaagcactt ttctgtgac acccagccctg tgctaaagct
 361 gtccctgtct gacacgtcct ccagccagat ggtggtcatg actgagactt tagctgtcat
 421 tgtgaccccccc ttcctgttca tcacatcttc tcacatgtcgaa atccatcatca ctgtgtccatcg
 481 aatccccctt ggacgctggga agtggaggcc ctctctacc tgtggctccc acctcactgt
 541 agtagccctt ttctacggga gtatataatgttgtatattt aggccccctgtt ccatgtactc
 601 agtgggtgaag gaccgagtag ccacagtat gtacacagta gtgacaccc (SEQ ID NO:96).

OR65

LOCUS AF127878 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA24) gene, partial cds.
 ACCESSION AF127878
 KEYWORDS .
 30 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 649)
 35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 45 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA24"
 50 CDS <1..>649
 /gene="CJA24"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCL"

VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVRLSFC
TDLEIPHFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGAGILYSYSKIVSSIRA
ISSAQKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAASVMYTVVTP" (SEQ ID

NO:97).

5 BASE COUNT 136 a 177 c 134 g 202 t
ORIGIN

1 ctttgttagac atctgtttt tgttaccac tgtcccaaag atgctggtaa atatccagac
61 acacagcaaa gtcacccacct ttgcaggctg catcacccag ataggccatt gcctacttct
121 tgcaagtattg gacgttta tgctgactgt gatggcctat gaccggatg tggccatctg
181 tcacccactg cactacacag tcaccattaa ccccgactg tggactgc tggctctgg
241 atcctggatc ctgagtgccc tgaattcctc attacaacc ttaatagtgc tgccgcttcc
301 cttctgcaca gacttggaaa tccccactt ttctgcgaa ctaatcagg tcatccaccc
361 tgccgttct gacactttt ttaatgtat ggtatgtat ttggccgctg tgctgctgg
421 ggggtgtccc ttgcaggga ttcttactc ttactctaag atagttccct ccatacgtgc
481 aactctatca gctcaggaa agtacaaggc atttccacc tggatctc acatcttaat
541 tgccttta tttatggta cactcctagg tggatccctt agtctgctg caactggcaa
601 ctcacattca agagctgcag ctcggatc gtacactgtg gtcacccccc (SEQ ID NO:98).

OR66

20 LOCUS AF127879 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA25) gene, partial cds.
ACCESSION AF127879
KEYWORDS
25 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
40 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA25"
45 CDS <1..>649
/gene="CJA25"
/codon_start=2
/product="olfactory receptor"
/translation="FADICFTSTTVPKMLVDIQTQSKMITFAGCLTQIFFVAFGCLD
50 NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLVLGSWCISVMVSLLETTLIRLSFC
TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQGQHKAFSTCGSHLSVVTLFYGTGLGVYLSAATPSSRTSLMASVMYTMVTP" (SEQ ID
NO:99).

BASE COUNT 130 a 183 c 136 g 200 t

ORIGIN

1 ctttgcgtac atctgttca catccacgac cgccccaaag atgctgggtgg atatccaaac
5 61 acaaagcaaa atgatcaacttgcagggtgc ctcacccag attttttt tcgttgcat
121 tggatgcctg gacaatttgc ttgcaggcgt gatggctat gaccgggtcg tggccatctg
181 tcacccctg cactacgcgg tcatcatgaa ccccccggctc tgtagactgc tagttctgg
241 gtcctgggtgc atcagtgtca tggttctct gtcgagacc ttgaccattt tgaggctgtc
301 ctctgcaca aacatgaaa tcccacactt ttttgtat gtctcgaag tcctgaagct
361 cgcctgtct gaaacctcg tcaataaaaat cgtgtatgtt gacaatggg
421 tggtttctt ctctgtgaa tcctatactt ttatctcgt attttcctt ccattctgag
481 agtatcacct gcccaaggcc agcacaaagc ctttccacc tgffggctc acctctcag
541 ggtcaccctcg ttctatggca cgggccttgg ggtatatctc agtctgcag ctacaccatc
601 ttctaggaca agtctgtatgg cctcggtat gtacaccatg gtcacccccc (SEQ ID NO:100).

OR67

15 LOCUS AF127880 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA26) gene, partial cds.
ACCESSION AF127880
KEYWORDS
20 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
35 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA26"
40 CDS <1..>649
/gene="CJA26"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGLTSTTVPRTIVNIQTHSRVIAYSCLTQMSFSIFFVCME
45 DMLLAVMAYDRFVAICHPLHYPVIMSPRLCGFLVLSAFLSLLISQVHNLLIVLQFSCF
KDIKISNFFCDPSQLTLACSDTFVNNNIVMNFFAAVFGFLPISGIFLSYYKIVSSIL
RVPSSSGKYKAFSTCSSHLAVVCLFYGTVLGVYLGSSVSSPRKRVVTSMYTVVTP" (SEQ ID
NO:101).
50 BASE COUNT 138 a 161 c 124 g 226 t
ORIGIN
1 ctggctgac attggttga cctccaccac cgccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatgcct atgcaagctg cctgacacag atgtttttt caatctttt
121 tgggtgtatg gaagacatgc tcctgtgt gatggctat gaccgggtcg tggccatctg
181 tcacccctcg cactatccag tcatcatgag cccacgactc tgccgttct tagtgtgtt

241 gtctgcttt cttagcctt taatatccca ggtgcacaat ttgattgtct tacaatttc
301 ttgcttcaaa gatataaaga ttcttaattt cttctgtac cctctcaac tcctcacact
361 tgctgttcc gacacgttg tcaataacaa catagtcatg aattcttg ctgctgtatt
421 tggtttctt cccatctcag ggatctttt gtcttactat aaaatgtttt ctcacatct
481 gagagtcca tcatcaagtg ggaagtataa agccttctct acctgtatct ctcacatggc
541 agttgttgc ttatttatg gaacagtccct tggagtgtac ctgggtcat cagtgtcate
601 cccccaggaag agatggtga ctcagtgat gtacacatgt gtcactccc (SEQ ID NO:102).

OR68

10 LOCUS AF127881 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA62) gene, partial cds.
ACCESSION AF127881
KEYWORDS
15 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
30 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA62"
35 CDS <1..>649
/gene="CJA62"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTPKTLVNIQTHSKVITFAGCITQIGHCLLFAVLD
40 VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFFCVLNQVIHLACSDTFLNDVVVMYLAVALLGGGPLAGILYSYSKIVSSIRA
ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNHSRAAASVMYTVVTP" (SEQ ID
NO:103).
45 BASE COUNT 133 a 179 c 135 g 202 t
ORIGIN
1 cttttagac atctgtttt tgtctaccac tgtccccaag acgtggtaa atatccagac
61 acacagcaaa gtcacccacct ttgcaggctg catcacccag ataggccatt gcctcctt
121 tgcatgtttt gacgtctta tgcgtactgt gatggcctat gaccggatgt tgcccatctg
181 tcacccactg cactacacag tcaccattaa ccccaactg tgcgtactgc tgggtctggc
241 atccctggatc ctgactgtcccc tgaattccctt attacaaacc ttaatagtg tgcggctt
301 ctctcgacaca gacttggaaa tcccccaactt ttctcgatca cttatccagg tcatccacat
361 tgccgttct gacactttt ttaatgtatgt ggtgtatgtat ttggccgtg tgcgtctgg
421 ggggtggccc ttgcaggga ttcttactc ttactctaag atagttccctt ccatacgatc
481 aatctcatca gtcaggagga agtacaaggc atttccacc tgcgtatctc acatctaat

541 tgtctcccta ttttatggta cactcctagg tgtgtaccctt agttctgctg caactggcaa
601 ctcacattca agagctgcag cctcggtat gtacacttg gtcacccccc (SEQ ID NO:104).

OR69

5 LOCUS AF127882 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA80) gene, partial cds.
ACCESSION AF127882
KEYWORDS
10 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA80"
30 CDS <1..>649
/gene="CJA80"
/codon_start=2
/product="olfactory receptor"
/translation="FTDICFTTIVPRMLVNFLSETKVISYMGCLVPMYFFMAFANTD
SYLLASMAIDRLVAICNPLHYDVAMNSRRCLLMLGSCSISHLHSLFRVLLMSRLSFC
ASHVIKHFFCDTQPVLKLSCSDTSSSQMVMTETLAVIVTPFLCIIFSYLRRIITVLR
IPSAAGKWRAFSTCGSHLTVALFYGSIIYVVFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID
35 NO:105).
40 BASE COUNT 123 a 194 c 139 g 193 t
ORIGIN
1 tttcacggat atctgcttca caacagtcat agtgcccagg atgctggtga atttctatc
61 agagacaaag gttatctctt acatgggtcg cctggccca atgtacttct tcatggcctt
121 tgccaacact gacagctacc tgctggcttc tatggccatc gacgggctgg tggccatcg
181 caacccctta cactatgtatggctatgaa ctccggcggt tgctactca tgctattggg
241 ttctgcage atctccccacc tacatccctt gtccgggtg ctactatgt ctgcgcgtc
301 ttctgtgcc tcccacgtca ttaagcactt ttctgtgac acccagccgt tgctaaagct
361 gcctgtctt gacacgtctt ccagccagat ggtggctatg actgagacct tagctgtat
421 tgtgacccccc ttctgtgtatc tcatcttcttccatctgcga atcatcatca ctgtgtctc
481 aatcccccttgcagccggga agtggaggccttcttacc tggctccc acctcactgt
541 agtagcccttgcagccggga gtattatata tgctatattt aggccctgttccatgtactc
601 agtgtgaag gaccgagtag ccacagttatgtacacatgtatgtacaccc (SEQ ID NO:106).

OR70

LOCUS AF127883 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA81) gene, partial cds.
5 ACCESSION AF127883
KEYWORDS
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
25 gene <1..>649
/gene="CJA81"
CDS <1..>649
/gene="CJA81"
/codon_start=2
30 /product="olfactory receptor"
/translation="FADICFTSTVPKMLVDIQTQSKMITFAGCLTQIFFVAFGCLD
NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLVLGSWCISVMVSLETTLTILRLSFC
TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
VSPAQGQHKAFTCGSHLSVVTLYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID
35 NO:107).
BASE COUNT 130 a 184 c 136 g 199 t
ORIGIN
1 ctttgctgac atctgcttca catccacgac cgccccaaag atgctgggtgg atatccaaac
61 acaaaggaaaa atgatcacatt ttgcagggtg cctcacccag atttttttt tcgttgcatt
40 121 tggatgcctg gacaatttc tcttgaccgt gatggcctat gacccgggtcg tggccatctg
181 tcacccctcg cactacgcgg tcatcatgaa ccccccggctc ttagactgc tagttctgg
241 gtccctggtc atcagtgtca tggttctct gctcgagacc ttgaccatt tgaggctgtc
301 ctctgcaca aacatggaaa tcccacact ttttgtgtat gttctcgaag tcttgaagct
361 cgcctgtct gaaacctctcg tcaataaaat cgtgtatgtat ttgtgacaa ttgaatggg
421 tggtttcct ctctctggaa tcctataactc ttatctcag attttctct ccatctcgag
481 agtatcacct gcccaaggcc agcacaaaagc ctttccacc tggggcttc acctctcag
541 ggcacccctcg ttctatggca cgggccttgg ggtatatctc agttctcag ctacaccatc
601 ttcttaggaca agtctgtatgg cctcgggtat gtacaccatg gtcacccccc (SEQ ID NO:108).

OR71

LOCUS AF127884 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA82) gene, partial cds.
ACCESSION AF127884

DRAFT 2002-100

KEYWORDS

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

5 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

10 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

20 gene <1..>649

/gene="CJA82"

CDS <1..>649

/gene="CJA82"

/codon_start=2

/product="olfactory receptor"

/translation="FADICFTSTTVPKMLVGIQTQSKMITFAGCLTQIFFVAFGCLD

NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLSWCISVMVSLETLTILRLSFC

TNMEIPHFFCDVLEVLKLAGSETLVNKIVMFVTIAMGVFPLSGILYSYSQIFSSILR

VSPAQGQHKAFSTCGSHLSVVTLYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID

30 NO:109).

BASE COUNT 129 a 183 c 137 g 200 t

ORIGIN

1 ctttgcgtac atctgttca catccacgac cgccccaaag atgctgggtgg gtatccaaac

61 acaaaggcaaa atgatecaatt ttgcagggtg ctcaccccg attttttttt tcgttgatt

121 tggatgcctg gacaatttgc tcttgaccgt gatggcctat gaccgggtcg tggccatctg

181 tcacccctcg cactacgccc tcatcatgaa ccccccggctc ttagactgc tagttctgg

241 gtcctgggtgc atcagtgtca tggttctct gtcgagacc ttgaccatt tgaggctgtc

301 ctctcgacaca aacatggaaa tcccacactt ttttgtgat gtctcgaaag tcctgaagct

361 cgcctgtct gaaacccctcg tcaataaaat cgtgatgtat ttgtgacaa ttgcaatggg

40 421 tggtttctct ctctctggaa tcctatactc ttattctcg attttctct ccatctcgag

481 agtatacacct gcccaaggcc agcacaaagc ctttccacc tgggggtctc acctctcag

541 ggccacccctg ttctatggca cgggccttgg ggttatatctc agttctcgag ctacaccatc

601 ttcttaggaca agtctgtatgg ctcgggtgat gtacaccatg gtcacccccc (SEQ ID NO:110).

45 OR72

LOCUS AF127885 658 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY10 pseudogene, partial sequence.

ACCESSION AF127885

50 KEYWORDS

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

OR73

35 LOCUS AF127886 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY11) gene, partial cds.
ACCESSION AF127886
KEYWORDS .
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
40 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
45 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Pongo pygmaeus"

/db_xref="taxon:9600"
 gene <1..>649
 /gene="PPY11"
 CDS <1..>649
 /gene="PPY11"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LADIGFTSTTVPKMIVDMQTHSRVISYAGCLTQMSFFVLFACMD
 DMLLSVMAYDRFVAICHPPDYPVTMNPFCGFLVLLSFFSLLDSQLHNWIALQITCF
 KDVEIPNFFCDPSQLPHLACCDTFTNDIVMYFLAAIFGFLPILGILFSYYKIVSSILR
 VSSSGGRYKAFATCGSHLSVVCLFYGTALGGYLSSDMSSYPRKGAVASVMYTVVTP" (SEQ
 ID NO:112).
 BASE COUNT 125 a 174 c 130 g 220 t
 ORIGIN
 1 ctggctgac atcggttca cctccaccac ggccccaaag atgattgtgg acatgcaaac
 61 tcacagcaga gtcatctctt atgcaggctg cctgactcag atgtttttt ttgtcccttt
 121 tgcatgtatg gatgacatgc ttctgagtgt gatggcctat gaccggtttg tggccatctg
 181 tcaccctccg gattacccag ttaccatgaa cccatgtttc tgtggctcc tagttttgtt
 241 gtctttttt ctcaagtcttt tagactccca gtcgcacaat tggattgcct tacaattac
 301 ctgcctcaag gatgtggaaa ttcccaattt ctctgtgc cttcccaac tcccccaacct
 361 tgcctgttgt gacacccatcca ccaatgacat agtcatgtat ttccctgtctg ccatatttg
 421 ttcttcccc acctgggaa tcctttctc ttactataaa attggctctt ccattctgag
 481 ggttcatca tcaggtggga ggtataaagc ctgcgccacc tggctctc acctgtcagt
 541 tggttgcata ttatggaa cagcccttgg agggcacctc agtgcagaca tgcctctta
 601 tcccaaaaaag ggtgcagtgg ctcaatgtat gtacacagtg gtcacccccc (SEQ ID NO:113).

OR74

LOCUS AF127887 654 bp DNA PRI 28-FEB-2000
 DEFINITION Pongo pygmaeus PPY12 pseudogene, partial sequence.
 ACCESSION AF127887
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
 REFERENCE 1 (bases 1 to 654)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 654)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue de la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..654
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>654
 /gene="PPY12"
 /pseudo
 BASE COUNT 124 a 178 c 135 g 217 t

DRAFT 24/2/00

ORIGIN

1 cttgcctgaa atcggttca ctcaccac gatcccaag attgtggaca tccaatctca
 61 caggcgttc atctctcg caggctgcc tgactcatgat gtccttgc cattttgga
 121 ggcacggaaag agagacatgc tcctgagtgt gatggctat gacgggttg tagccatcg
 181 tcaccccta tatcattcag tcatcatgag cccgtgttc tgccgttcc tagtttgtt
 241 gctttttttt ttcttcag tcttttagac tcccagctgc accacttgat tgccctgcta
 301 atgacctact tcaaggatgt ggaaattccg aatttcttct gtgatcctc tcaactcccc
 361 catatgcattttgtatgc ctccaccaat aacatcatca tgatattccc tgcaacatg
 421 ttgtttttc ttccatctc gggacttctt ttcttact ctaatattgt ctcccttatt
 481 ctgagggtttt cgtcatcagg tggaaatat aaagccctct ccacctgtgg gtctactgg
 541 tcagttttt gctgagctc tggAACAGGC gttggagggt acctcagttc agatgttca
 601 tctccccca gaaagggtgc agtggctca gtgatgtca ccgtggcac cgcc (SEQ ID NO:114).

OR75

15 LOCUS AF127888 649 bp DNA PRI 28-FEB-2000
 DEFINITION Pongo pygmaeus olfactory receptor (PPY49) gene, partial cds.
 ACCESSION AF127888

20 KEYWORDS
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

25 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates
 JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers
 source 1..649
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>649
 /gene="PPY49"
 40 CDS <1..>649
 /gene="PPY49"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDTCFISTTVPKMLVNIQARSKEISYMGCLTQVYFLMMFAGMD
 TFLLAVMAYDRFAICHPLQYAVIMNPHECGLLVLASWFIFWVSLVHILLMKRLTFS
 TGTEIPFFCELAQVLKVARSDTLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
 MSSTEGKYKAFSTCGSHLCVVSLFNGTGLGVYLSSAVTHSSQSSMASVMYAMVTP" (SEQ ID NO:115).
 BASE COUNT 119 a 187 c 146 g 197 t

50 ORIGIN
 1 ctttggttca ttcaccac agtcccaag atgttagtga acatccaggc
 61 acggagcaaa gaaatctct acatgggttg ctcactcgt gtttatattt taatgtatgtt
 121 tgctggatg gatacttcc tactggctgt gatggctat gacgggttg tggccatctg
 181 ccacccctt cagtagcgg tcatcatgaa ccccatctc tgccgttcc tggttctggc

241 atcttgggtc atcatttct gggctccct ggtcatatt ctactgatga agagggtagac
301 cttctccaca ggcactgaga ttccgcattt ctctgtgaa ctggctcagg tcctcaagggt
361 gccccgcctt gataccctcc tcaataacat tgtctgtat gtggccacgg cactgctggg
421 tgggttcctt gtagctggga tcctctcctt ctactctcag atcgctcctt ccttaatgag
481 aatgtccctcc accgaggggca agtacaaagc cttttcacc tggttatc acctctgtgt
541 ggtctcccttg ttcaatggaa caggactgg ggttatc acgtctgctg tgacccatcc
601 ttcccagage agtccatgg cctcagtgat gtatgccatg gtcacccccc (SEQ ID NO:116).

OR76

10 LOCUS AF127889 660 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY50 pseudogene, partial sequence.
ACCESSION AF127889
KEYWORDS .
15 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 660)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
30 source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY50"
/pseudo
35 BASE COUNT 122 a 181 c 146 g 211 t
ORIGIN
1 ctggcgtac atcgtttca cttccaccac ggtcccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatctctt atgcaggctg cctgactcag atgtgtctcc tggccatTTT
40 121 tggaggcatg gaagagagac atgctctga gtgtatggc ctatgagccgg ttgttagccc
181 tctgtcaccc ttatatcgatcgtccatct tgaacccgtt ttctgtggc ttccatgatt
241 tgggtctttt gtttctttt tcctcgtctt tttagactcc cagctcgca acttgattgc
301 cttacgcatg acctgcgtca aggatgtggaa aattcttaat ttcttctggg aaccttctca
361 actccccat ttacattttt gtgacacccat caccagaac atccacatgt attccctgc
421 tgcgtatTTT ggtttcttc ccacatcggttgg ggccttttc ttacggta aaattgtttc
481 ctcattctg agggttcat catcagggtgg gaagtatcaa ctttctccac ctgtgggtct
541 cacctgtcatg ttgttgctgtt attttacggaa acaggcggtt gagggttagct gggttcagat
601 gtgtcatcccc ccccgagaaa ggggtcgatgt gcctcagtgat gtacacgggtt ggtcacccccc (SEQ ID NO:117).

OR77

LOCUS AF127890 648 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY51 pseudogene, partial sequence.
ACCESSION AF127890

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

5 REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

10 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

20 gene <1..>648

/gene="PPY51"

/pseudo

BASE COUNT 128 a 183 c 134 g 203 t

ORIGIN

25 1 ctttgcac atctgtttg tgtctagcac tctaccaaag atgctggta atatccagac
61 acacagcaaa gtcacccacct atgcaggctg catcacccag gtgtgccttt tcgtatttt
121 tcaggattg gacatcttc tcctgactgt gatggcctat gacggttgt ggccatctgt
181 cacccttc actacacggt catcatgagc cccaggctct gtggactgt ggttctggca
241 tcctggatca tgagtgcctt gaattccctg ctacaaagct taatagttact gcccgtttcc
301 ttctgcacag attggaaat cccccacttt ttctgtgaac ftaatcaggt cacccaccc
361 gcctgttcg acaccccttta taacgacatg gtgtatgtt ttctgttcg gtgtggggc
421 ggtgtcccccc tcaactggat ctcttactct tactctaaga ttgtttccctc catacgta
481 atctcatcag cttagggaa gtacaaggca ttttccacct atgegtctca cctctcagtt
541 gtccttat ttatggtaa actcttaggg gtgtacccta gttctgtgc aacccacaac
601 tcatactcaa gtgtgcacg ctccgtatg tacactgtgg tcacccccc (SEQ ID NO:118).

OR78

40 LOCUS AF127891 660 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY52 pseudogene, partial sequence.

ACCESSION AF127891

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

45 REFERENCE 1 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

50 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..660
5 /organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY52"
/pseudo
10 BASE COUNT 122 a 181 c 146 g 211 t
ORIGIN
1 ctgcctgac atcagttca cctccaccac ggccccaaatgattgtgg acatccaaatc
61 tcacagcaga gtcatctcct atgcaggctg cctgactcgatgtgtctcc tggccatttt
121 tggggcatg gaagagagac atgcctctga gtgtatggc ctatgagcggtttagcccc
15 181 tctgtacccc tctatatcgatcgcctatct tgaacccgttctctgtggc ttccatgt
241 tgggtctt gtttcttt tcctcagtctttagactcc cagctgcga acttgattgc
301 cttagcatacctgcatacggatgtggaa aattcctaat ttcctctggaaaccttcata
361 actccccatctacatgttggacacattt caccatgtatccatgttattccatgc
421 tgcgttatttgggttcttc ccaatcggttggcccttttc tcttacggtaaaatgtttc
481 ctccattctg agggttcat catcaggatggaaaggtatcaa ctttctccac ctgtgggtct
541 cacctgtcag ttgttgcgtttagttacggaa acaggcggttggggtagctgggttagat
601 gtgtcatccc ccccgagaaa gggfgcagtg gcctcgtatgttacacgggtgtcaccccc (SEQ ID NO:119).

OR79

LOCUS AF127892 633 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY76 pseudogene, partial sequence.
ACCESSION AF127892
KEYWORDS
30 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 633)
35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 633)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

45 source 1..633
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>633
/gene="PPY76"
/pseudo
50 BASE COUNT 134 a 155 c 124 g 220 t
ORIGIN
1 ctgcctgac attggttca cctggccac ggccccaaatgattgttag acatgcaatc
61 acatagcaaa gtcatctccc atgcggctg tctgacacag atatcttctt tggcccttt

121 tgcgtata gatgacatgc cctgactgt gatggcctat gactgattcg tggccatctg
181 tcacccctg aactaccag tcatacatgaa tcctcaccc tgcgttttct tagtgttgg
241 gctttttcc tttagcctgtt ggatcccag ctgcacaatt ggattgttac aattcacctg
301 ctcaagaat gtggaaatct ttaatttgc ctgtgactga tctcaaccc gcccgttcg
361 actgtgtcat cagaacata ttcatcatt tagatgtac aatactggg ttcttcca
421 ttccaggat cccttgcct tactataaaa ttgtgcctca cattctaaga attccattgt
481 cagatggaa gtataaagcc ttctccaccc gtggctctca cctggcaatt gtttgcttat
541 ttatggAAC aggcattggt gtgtacccgatc cttcagctgt gtcactatcc cccaggaatg
601 gtgtggcag tggatgt tggccacc ccc (SEQ ID NO:120).

10

OR80

LOCUS AF127893 648 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY77 pseudogene, partial sequence.
ACCESSION AF127893
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>648
/gene="PPY77"
/pseudo
BASE COUNT 140 a 172 c 129 g 207 t
ORIGIN
1 ctttgcgtac ctctgtttt cctccacaac cgccccaaag atgtactga atatactgac
61 acagaacaaa ttccataacat atgcaggctg tctcggttagt atttttttt tcacttcatt
121 tggatgcctg gacaattttc tcttgaccgt gatggcctat gaccgcttca tggccatctg
181 tcacccctg cactacacac ggtcatcatg aaccaccagg tctgtggact gtcgttctca
241 gggccttagt gcatcgtgtt catgggtccc tgctcaagac ctgtactgtt tgaggctgt
301 cctctgcaca aaatggaaat tccacactt tttgtgatc ttcttgaaat cctgtggctc
361 gcctgttctg acacccat caataacgtt gtgtatataact ttgtcaactgg catcctgggt
421 gtgatccct tcaactggat acttttctc tactataaaa ttgtttctc tataactgagg
481 attccctcag ctgggagaaa gtgcaagac tttccaccc gtgggtccc cctctcagtg
541 gtcagcttgt tctatggcac aggtttggg gtctatctca gttctgcagc tacaccatct
601 tctaggacaa gctctggc ctcagtatgt tacaccatgtt acccccc (SEQ ID NO:121).

09243155 = 422400

OR81

LOCUS AF127894 660 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY78 pseudogene, partial sequence.
5 ACCESSION AF127894
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 660)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
25 gene <1..>660
/gene="PPY78"
/pseudo
BASE COUNT 118 a 185 c 140 g 217 t
ORIGIN
30 1 ctggcctgac atcggttca cctccaccac ggtcccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatctcct atgcaggctg cctgactcag atgtgtctcc tggccatTTT
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagccg tttagcccc
181 tctgtcaccc tctatatcgta tcagccatct tgaacccgtg ttctgtggc ttccatgatt
241 ttt
301 cttacgcatg acctgttca aggatgttga aattcttaat ttcttctggg aacccttctca
361 actcccccat ttacattttt gtgacacattt caccagtaac atccacatgtt atttccctgc
421 tgccgttattt gtttttcttc ccattctggg gccccttttcttactgtta aaactgtttc
481 ctccattcttg agggtttcat catcagggtgg ggaggtatcaa ctttctccac ctgtgggtct
541 cacctgttagt ttgtttgttattttatggaa acagcccttg gagggtacct cagttcagtt
40 601 gtgtccctttt cctccaggaa gggtgactgt gcctcagtgatgttacccgtt ggtcacccccc (SEQ ID NO:122).

OR82

LOCUS AF127895 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus PPY85 pseudogene, partial sequence.
45 ACCESSION AF127895
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
50 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

OR83

30 LOCUS AF127896 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY9) gene, partial cds

ACCESSION AF127890

KEYWORDS

35 SOURCE orangutan.

ORGANISM *Pongo pygmaeus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

40 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

45 AUTHORS Giorgi,D.G. and Ro

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

50 source 1..649

/organism="Pongo"

gene <1..>649 /db_xref="taxon:9600"

/gene="PPY9"

DRAFT 27/02/2000

5 CDS <1..>649
 /gene="PPY9"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFASTTVPKMLVNIQASQKVITYAGCITQMYFFTHFVGLD
 SFLLTVMAYDRFVAICHPLHYTVIMNPQLCGLLVLASWIMSVLHSLLQSLMVLRLSLC
 RELEIPHFFCELNQVIHLACSDTFLDDMVLYAAVLLGGGCLAGILYSYSKIVSSICA
 ISSAQGKYKAFSTCASHLSVVSLFYCTSLGVYLSSAAIHNSHSSAIASVAMYTVVTP" (SEQ ID
 NO:124).
 10 BASE COUNT 136 a 173 c 140 g 200 t
 ORIGIN
 1 cttttagac atctgttttgccttaccac ggtcccaaag atgctggta atatccaggc
 61 acagagcaaa gttatcacct atgcaggctg catcacccag atgtacttt tcacacattt
 121 tgttaggattg gacagctcc ttccataactgtt gatggctat gacgggtttg tggccatctg
 15 181 tcaccccttg cactacacgg tcatacatgaa ccctcaactc tggatttc tggtctggc
 241 gtcctggatc atgagtgtct tgcatttcattt attacaaggc ttatggtc tgcgggtgtc
 301 cttatcgaga gagttggaaa tccccactt ttctcgaaaa cttaatcagg tcataccac
 361 tgccgttct gacacccttc ttgatgatc ggtgatgtat ttggcagctg tgctgctggg
 421 tggggatgt ctgcgtggaa tcccttaactc tcactctaag atagttccct ccatatgtgc
 481 aatctcatca gctcaaggga agtataaggc atttccacc tgcgcatactc acctctcagt
 541 tgccttcatttattgttgcgacccaggatgttacccatc agtgcggctg caatccacaa
 601 ctacacactca agtgcaatag ctcagtgatc gtacaccctg gtcacccccc (SEQ ID NO:125).

OR84

25 LOCUS AF127897 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO27) gene, partial cds.
 ACCESSION AF127897
 KEYWORDS .
 30 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 45 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO27"
 50 CDS <1..>649
 /gene="SBO27"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDFCLATDTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD

SVLIAVMAYDRFVAICHPLHYATIMSPRLCGLLVGAPWVFSCFISLTHILLMARLVFC
GSLKVPHYLCDLTPILRLSCTDTSVNRIFILTAVAGMVIATPFICILASYACILVAIMK
IPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCSSVHTAVKEKASAVMYTVVTP" (SEQ ID

NO:126).

5 BASE COUNT 112 a 218 c 145 g 174 t
ORIGIN

1 cctggttgat ttctgtctgg ccacccgacac catccccaaag atgctggta gccttcaaac
61 caggagcaag gcccattctt atccctgtc cctgacccag atgtacttct tccattttt
121 tggcatcgat gacagcgctt taatttgctgt aatggcgat gaccgctttg tggccatctg
181 ccaccccttg cactacgcca cgatcatgag cccacgcctc tgtggctgc tggcggggc
241 cccctgggtt tttcatgtc tcacatctact caccacatc ctctgtatgg cccgcctcg
301 ttctgcgggc agccctaagg tgcctattt ctgtgcgac ctcactccca tcctccgact
361 ttctgcaca gacacgtctg tgaacaggat ttcatcctc actgtggcag ggatggtata
421 agccacgccc ttcatctgc tcctggctc ctatgttc atcctttagt ccacatgaa
481 gatcccccttgc gcaaggaaagc ttctccacc tgcagctcc acctgtccgt
541 ggttgtcttc ttcatggga ccaccatgg ggttacactg tgccctctt cggccacac
601 cgctgtaaag gagaagactt ctgctgtat gtacacagta gtcacccccc (SEQ ID NO:127).

OR85

20 LOCUS AF127898 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO28) gene, partial cds.
ACCESSION AF127898
KEYWORDS .
25 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
40 source 1..646
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>646
/gene="SBO28"
45 CDS <1..>646
/gene="SBO28"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGFTSTTVPRTIVNIQTHSRVIAASCLTQMSFSIFFACME
50 DTLLAVMAYDRFVAICHPLHYPVIMPRLCGFLVLVSFLSLLISQVHNLLIVLQFSCF
KEIKISNFFCDPSQLLTSCSDTFVNNTNFIAAVFGFLPISGIFFSYYKIAPSILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
NO:128).
BASE COUNT 137 a 167 c 122 g 220 t

ORIGIN

1 ctggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcatcgct atgcgagctg cctgacacag atgtcttt caatatttt
121 tgcgttatg gaagacacgc cctggctgt gatggctat gaccggttt ttggcatctg
181 tcacccctg cactacccag tcatacatgaa cccacgactc tgtagcttct tagtgtgg
241 gtctgtttt cttagcctt taatatccc ggtgcacaat ttgatgtct tacaattttc
301 ttgcttaaaa gagataaaga ttcttaattt ctctgtgac cctctcaac tcctcacct
361 ttctgtct gacaccttg tcaataacat agtcacgaat ttcttgctg ctgtattttgg
421 ttcttccca atctcaggga ttcttctc ttactataaa attggccctt ccattctgag
481 agtccattt tcaagtggga agtataaagc ttctccacc tttagcttc acctggcagt
541 tggtagctt ttatggaa cagtcattgg agtgcattt ggtcatcaa tggcatcccc
601 caggaagagt gtggggctt cagtgatgtt cacagtggc actccc (SEQ ID NO:129).

OR86

LOCUS AF127899 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO29) gene, partial cds.
ACCESSION AF127899
KEYWORDS
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>649
/gene="SBO29"
CDS <1..>649
/gene="SBO29"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPRFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSAAATGNSHSGAAALVMYTVVTP" (SEQ ID
NO:130).
BASE COUNT 138 a 177 c 133 g 201 t
ORIGIN
1 cttagac atctgtttt tgcattaccac tgtccgaag atgcgtttaa atatccagac
61 acacagcaaa gtcatcacct ttgcaggctg catcacccag ataggccatt gcctacttt
121 tgcaggattt gacatctta tgcgtactgt gatggctat gaccggatg ttggcatctg
181 tcacccctg cactacccag tcaccaattaa cccacgactc tgtagcttc tggcatctgg

241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgccgc
 301 cttctgcaca gacttggaaa tcccccgctt ttctcgaa ctaatcagg tcatacatct
 361 tgctgttat gacacttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctgg
 421 cggtggtccc ctacagggaa ttatctactc ttactctaag atagtttcct ccatacgtc
 481 aatctcatca gtcagggga agtacaaggc gtttccacc tgtcatc acatctaat
 541 tgcctcccta tttatggta cactcctagg ttttgcctt agttctgtc caactggcaa
 601 ctcacattca ggtgtcgac ctttgtat gtacactgtg gtcacccccc (SEQ ID NO:131).

OR87

10 LOCUS AF127900 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO30) gene, partial cds.
 ACCESSION AF127900
 KEYWORDS
 15 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO30"
 35 CDS <1..>649
 /gene="SBO30"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHSKVITFADCITQIGHCLLFAALD
 40 IFMLTVMAYDRYVATCHPLHYVTINPRLCGLLVLASWILSALNSSLQPLIVRLSFC
 TDLEIPHFFCELNQVHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
 ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMYTVVTP" (SEQ ID
 NO:132).
 BASE COUNT 141 a 179 c 130 g 199 t
 45 ORIGIN
 1 cttttagac atctgtttt tgcattaccac tgcggcggaa atgctggtaa atatccagac
 61 acacagcaaa gtcattaccat ttgcggactg catcaccggc ataggccatt gcctacttt
 121 tgccggatgg gacatctta tgcgtactgt gatggccat gacccggatg tggccaccc
 181 tcacccctgg cactacacag tcacccatgg cccggactg tgcggactgc tggccatgg
 50 241 atcctggatc ctgagtgccc tgaattcctc attacaaacc ttaatagtgc tgccgc
 301 cttctgcaca gacttggaaa tcccccgctt ttctcgaa ctaatcagg tcatacatct
 361 tgctgttat gacacttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctgg
 421 cggtggtccc ctacagggaa ttatctactc ttactctaag atagtttcct ccatacgtc
 481 aatctcatca gtcagggga agtacaaggc gtttccacc tgtcatc acatctaat

541 tgtctcccta ttttatggta cactcctagg tgtgtacctt agtgtctgca caactggcaa
601 ctcacattca agtgctgcag ccttggat gtacacagtgc gtcacccccc (SEQ ID NO:133).

OR88

5 LOCUS AF127901 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC31) gene, partial cds.
ACCESSION AF127901
KEYWORDS
10 SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC31"
30 CDS <1..>649
/gene="SSC31"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMHTVVTP" (SEQ ID
35 NO:134).
40 BASE COUNT 141 a 178 c 131 g 199 t
ORIGIN
1 cttttagac atctgtttt tgtctaccac tgtcccgaaatgtggtaa atatccagac
61 acacagcaaa gtcacatcacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcatcgatg gacatctta tgctgactgt gatggcttat gacccgtatg tggccatctg
181 tcacccctgc cactacacag tcaccattaa ccccgactg tggactgc tggctctggc
241 atctggatc ctgaggcccc tgaattccctt attacaaacc ttaatagtc tgccgcttc
301 ctctgcaca gacttggaaa tcccccaactt ttctgcgaa cttaatcagg tcatacatct
361 tgccgttat gacacttcc ttaatgtat ggtatgtat ttgcagctgatgc tggctctgg
421 cgggtgtccc ctcacaggaa ttatcttactc ttactctaag atagttccctt ccatacgatgc
481 aactctatca gtcaggggaa agtacaaggc gtttccacc tggcatctc acatcttaat
541 tgtctcccta ttttatggta cactcctagg tgtgtacctt agtgtctgca caactggcaa
601 ctcacattca agtgctgcag ccttggat gtacacagtgc gtcacccccc (SEQ ID NO:135).

OR89

LOCUS AF127902 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC32) gene, partial cds.

5 ACCESSION AF127902

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 646)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..646

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

25 gene <1..>646

/gene="SSC32"

CDS <1..>646

/gene="SSC32"

/codon_start=2

/product="olfactory receptor"

/translation="LADIGFTSTTVPTIVNIQTHSRVIAYASCLTQVSFSIFFACME

DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLLIVLQFSCF

KEIKISNNFFCDPSQLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYYKIAASSILR

VPLSSGKYKAFSTCSSHLAVVCLFYGTIVGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID

35 NO:136).

BASE COUNT 135 a 166 c 123 g 222 t

ORIGIN

1 ctggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac

61 tcacagcaga gtcatgcct atgcgagctg cctgacacag gtgtctttt caatctttt

40 121 tgcgtgtatg gaagacacgc tcctggctgt gatggctat gacgggttg ttgccatctg

181 tcacccctcg cactaccag tcatacatgaa cccacgactc tgtggcttc tagtgtgtt

241 gtcgtttt cttagccctt taatatccca ggtgcacaat ttgatgtct tacaatttc

301 ttgcttcaaa gagataaaga ttcttaattt cttctgtgac cttctcaac ttctcacccct

361 ttctgttctt gacacccatg tcaataacat agtcacgaat ttcttgctg ctgtatgg

421 ttttttccc atctcaggaa tttttttc ttactataaa atgctccct ccattctgag

481 atttccatta tcaagtggaa agtataaagc ttctccacc tttagctctc acctggcagt

541 ttttgctta tttagggaa cagttattgg agtgtacctt gggcatcaa tggcatcccc

601 caggaagagt gtggggcct cagtgatga cacagtggc actccc (SEQ ID NO:137).

50 OR90

LOCUS AF127903 649 bp DNA PRI 28-FEB-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC33) gene, partial cds.

ACCESSION AF127903

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

5 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

10 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, 15 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

20 gene <1..>649

/gene="SSC33"

CDS <1..>649

/gene="SSC33"

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTIPKLLQNMQSQDPSIPYAGCLTQMYFFLYFSDLE

SFLLVAMAYDRYVAICLPLHYATIMSPMLSRSLSVALSWLTTFHAMLHTLLMARLRFC

ADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPLLIIGSYARIVFSILK

VPSSKGICKAVSTCGSHLSVSLFYGTIVGLYLCPSANNSTLKETVMAVMYTVMAP" (SEQ ID

30 NO:138).

BASE COUNT 115 a 192 c 134 g 208 t

ORIGIN

1 ctctctgac ctctgttct ctctgtgac cattccaaag ttgttacaga acatgcagag

61 ccaagaccca tccatccccat atcgggctg cctgacccag atgtacttct tcttgtattt

121 ttccgatcta gagaccttcc tcccttgcc catggctat gaccgctacg tggccatctg

181 cctcccccata cattacgcca ccatcatgag ccccatgtg tctcgctcc tggtggcgct

241 gtcctgggtg ctgaccacct tccatgcat gtgcacact ttactcatgg ccagggtcg

301 ttttgtgca gacaatgtga tccctccactt ttctgtgat atgtctgctc tgctgaagct

361 ggcctgctct gacactcgag ttaatgaatt ggtgatattt atcatgggag gcctcattct

40 421 tgtcatccca ctctactta tcattgggtc ctacgcacga attgtctct ccatcctcaa

481 ggcccttct tctaagggtt tctgaaggc cgctctact tggctccc acctctgt

541 gggtgtactg ttctatggga ctgttattgg tctctactta tgcctcatcg ctaataattc

601 tactctaaag gagactgtca tggctgtat gtacactgt atggccccc (SEQ ID NO:139).

45 OR91

LOCUS AF127904 646 bp DNA PRI 28-FEB-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC34) gene, partial cds.

ACCESSION AF127904

50 KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
5 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
10 gene <1..>649
/gene="SBO64"
/pseudo

BASE COUNT 145 a 157 c 129 g 218 t

ORIGIN

15 1 ctttgcgt ttctgttatt ccaccacgt tataccaaa ctgctggaga acttgggttg
61 ggaagacaga agcatctcct tcacaggatg cgcatgcaa ttcttttg ccagcatatt
121 tgggtgaca gaaatattca tgctggcagt gatggcstat gacagattt tggtgggtg
181 ttaccctctg ctctcacacag ttgcaatgtc ccagaggcctt ttcttttgt tagtgctac
241 atcatacttc agggtgacag tctgtttttt gacaattacc ttctttctcc tggattttc
301 cttcagagga aataaatatca ttataactt tgggtgttag cctgctgcca ttgttgctgt
361 gccatgcctt gacccttaca tgagccagga aatcattttc atttctgcca cattcaatga
421 aacaagcagc ctgatgtatca ttctcaccc ctaagatttc gtttttatca atgtcatatgat
481 gatgcctcc actggggggc gcataaaaagc atgcgcgacc tggccccc agctgaccgc
541 cattatcatt ttccatggga ccatctctt tctctattgt gttcttaact cccaaaggttc
601 atggctcatgt gtcagggtgg gtcataatctt ttacacagt gtcatcccc (SEQ ID NO:142).

OR93

LOCUS AF127906 649 bp DNA PRI 28-FEB-2000
30 DEFINITION Saimiri boliviensis olfactory receptor (SBO65) gene, partial cds.
ACCESSION AF127906

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

45 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
50 gene <1..>649
/gene="SBO65"
CDS <1..>649
/gene="SBO65"

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/codon_start=2
/product="olfactory receptor"
/translation="FVDICVTSTTIPKTLSNIQTHSKVITYAGCVTQLYFSVLFIGLD
SLLLTVMAYDRFVAICHPLRYMViMNPQLCGLLVLVSWIMSALHSLTESLMALSLLFC
TDLKILHFFCELNQIIHIACSDTCLNNLVMYLSAVLGGGAGILYSYSKIASSIRA
ISSAKGKYKAFSTCASHLSVVSLFYCTGLGVYLSAATHNSLSSTAASVMYTVVTP" (SEQ ID
NO:143).
BASE COUNT    141 a   180 c   130 g   198 t
ORIGIN
1 ctttgtaca gacttgaaaa ttctccactt ttctgtgaa ctaatcaga taatccacat
61 acacagcaaa gtcacacccat atgcaggctg tgcacccag ttgtactttt ctgtactctt
121 tataggggtt gacagcttac tcctgaccgt gatggcctat gaccgatttggccatctg
181 tcacccctgt cgctcatatgg tcatcatgaa ccctcagctc tggactgc tggttctgtt
241 gtcctggatc atgagtgcctc tgcattccctt gagacaaaatggcat tatactgtt
301 ctttgtaca gacttgaaaa ttctccactt ttctgtgaa ctaatcaga taatccacat
361 tgcctgttctt gacacccatc ttaataacctt ggtgtatgtt gtcacccatc tgctgtggg
421 cgggtggctt ctgcgtggaa tccgttactc ttactctaag atagcttccatc ctatacgatc
481 aatctcatca gctaagggga agtacaaggc attttccaccat tgcacccatc acctctcagt
541 tgcctgttctt tttatgtt caggcctagg ggtgtacccatc agttctgtt caacccacaa
601 ctcactctca agtacagcag ctcgggtat gtacactgtt gtcacccccc (SEQ ID NO:144).

```

OR94

LOCUS AF127907 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri sciureus olfactory receptor (SSC69) gene, partial cds.
 ACCESSION AF127907
 KEYWORDS
 SOURCE common squirrel monkey.
 ORGANISM Saimiri sciureus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Saimiri sciureus"
 /db_xref="taxon:9521"
 gene <1..>649
 /gene="SSC69"
 CDS <1..>649
 /gene="SSC69"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
 IFMLTVMAHYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQPLIVLRLSFC
 TDLEIPHFFCELNQVHLACYDTFLNDVVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRAF

ISSAQGKYKAFSTCASHILIVSLFYGTLLGAYLSSAATGNHSSAAALVMYTVVTP" (SEQ ID

NO:145).

BASE COUNT 139 a 179 c 131 g 200 t

ORIGIN

5 1 cttttagac atctgtttg tgttaccac tgtcccaag atgtggtaa atatccagac
61 acacagcaaa gtcacccact ttgcaggctg catcacccag ataggccatt gcctacttt
121 tgacgatttg gacatctta tgctgactgt gatggcatt gaccggatg tggccatctg
181 tcaccccttg cactacacag tcaccattaa ccccaactg tggactgc tggcttgc
241 atctggatc ctgagtgccc tgaattccctt attacaaccc ttaatagtgc tgccgcttcc
10 301 cttctgcaca gactggaaa tccccactt ttctgceaa ctaatcagg tcatacatct
361 tgccgttat gacacttcc ttaatgtgt ggtgtatg tggcagcta tgctgctgg
421 cgggttccc ctacaggaa ttatctactc ttactctaag atagtttctt ccatacgatc
481 aatctcatca gctcaggaa agtacaaggc gtttccacc tgcacatctc acatcttaat
541 tgctcctta ttatgtta cactccttagg tgcgtacattt agtctgtg caactggcaa
15 601 ctacattca agtgcgcag cttggatgt gtacactgtg gtcacccccc (SEQ ID NO:146).

OR95

20 LOCUS AF179716 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA133) gene, partial cds.

ACCESSION AF179716

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

40 source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA133"

CDS <1..>487

/gene="PPA133"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI

50 LKVPSKGICKAFSTCGSHLSVVSFLYGTIIGLYFCPSANSSTLKETVMAMMMYTVVTP
ML" (SEQ ID NO:147).

BASE COUNT 82 a 141 c 107 g 157 t

ORIGIN

1 tgtggccatc tgctcccccc tgcaactacac cgccatcatg agccccatgc tctgtctcg

5 61 cctgggtggcg ctgtcctggg tgctgaccac ctccatgcc atgttacaca ctttactcat
121 gcccagggtg ttttttggtg cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatggg
241 agggtcgatt ctgtcatacc cattcctact catcctggg tcctatgcac ggatgtctc
301 ctccatcctc aagggtccctt cgtaaggat tatctgcaag gcgttctcta ctggcgttc
361 ccacctctct gtgggtcac tggatggg gaccattatt ggtctact tctgcccate
421 agtcaatagt tctactaa aggagactgt tatggctatg atgtacactg tggatggacccc
481 catgctg (SEQ ID NO:148).

10 **OR96**

LOCUS AF179717 486 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA134) gene, partial cds.

15 ACCESSION AF179717

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

20 REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

25 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

30 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Papio hamadryas"

/db_xref="taxon:9557"

35 gene <1..>486

/gene="PPA134"

CDS <1..>486

/gene="PPA134"

/codon_start=2

40 /product="olfactory receptor"

/translation="VAICQPLHYSTLLSPWACMAMVGTWSLTGIITATTHAFLIFSLP
FPSRPIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
LAMASTQSRRKVFSTCSSHLLVVSLLFFGTASITYIRPQAGSSVTTDRVLSVFYTVITP
ML" (SEQ ID NO:149).

45 BASE COUNT 85 a 181 c 97 g 123 t

ORIGIN

1 tggccatc tgccagccctc tgcaactactc taccctcttg agccatggg cctgcatggc

61 catgggtggc accctctggc tcacaggcat catcacggcc accacccatg cttccat

121 cttctctcta cttttccca gccggccaaat catccacac ttctctgtg acatccgtcc

50 181 agtactgagg ctggcaagtg ctggaaagca caggagcgag atctctgtga tgacagccac

241 tgtgtcttc attatgtatcc cttctctctt gattgtcacc tcttacatcc gcatccgtgg

301 agccatccta gagatggccct ccacccagag cggccgcaag gtcctctcca cctgtctc

361 ccatctgctc gtggctctc tcttcttgg aacagccagc atcacatcaca tccggccgca

421 ggcaggctcc tctgttacca cagaccgcgt ctcgtgtg ttctacacgg tcacacacc

481 catgtct (SEQ ID NO:150).

OR97

5 LOCUS AF179718 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA135 pseudogene, partial sequence.
ACCESSION AF179718
KEYWORDS
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA135"
/pseudo
30 BASE COUNT 112 a 140 c 89 g 146 t
ORIGIN
1 tgtggacatc tgaagtccct tgcaactaccc agtcatcatg aacgaaagaa cacgggcca
61 actggctgct gcctccctgg tccaggcct tcctgttagct actgtgcaga ccacgtgg
121 ctccagctt ccattctgtg gcaccaacaa ggtgaaccac ttcttcgtg acagcccacc
181 tgtgtctgaag ctggctctgt tagacacagc actgttttag atctacacca tcactgg
241 cattctggtg gtcatgatcc cctgcgtgt gtatgtgt tcctacactc tcattgtgc
301 tgccatccctc aagatcccat cagctaaagg gaagcataaa gccttctcta cgtgatc
361 acatctcctt gtgtctctc ttttatct atcattaaac ctcacatatt ttcagc
40 421 atcaaataat tctccctgaaa gcaaaaaagct gctatcattg ttctacactg ttgtactcc
481 catgttg (SEQ ID NO:151).

OR98

45 LOCUS AF179719 482 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA136 pseudogene, partial sequence.
ACCESSION AF179719
KEYWORDS
SOURCE baboon.
50 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 482)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

5 REFERENCE 2 (bases 1 to 482)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

10 FEATURES Location/Qualifiers

source 1..482
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>482
15 /gene="PPA136"
/pseudo

BASE COUNT 91 a 151 c 96 g 144 t

ORIGIN

20 1 ttgtggccatc tgccacccccc tctactatgt cacagccatg agtccctggac tctgttatctt
61 gctcctctgc ttgtgttggg ggctctctgt tctctatggt ctctctctca ctctccct
121 gaccagggtg accttctgtg ggactcaaga gatccactac ctcttctgtg agatgtacgt
181 cctgctgcag ctggcatgtt ccaacacccca catcattcac acagtgtcg ttgctactgg
241 ctgtttctt cctcgaacccc tttagggtca cgactacatc ctatatacg attgtcagaa
301 ccatccctca gataccctca gcctctaaga aacacaaaac ctctctgccc tgtgcctcac
361 atttgggtgt ggctccctc ttttatggga cacttggtt ggataccctg cagccccctcc
421 acacctactc catgaaggac tcagtagcca cagtgtatgt tgctgtggtg acacatgtga
481 tg (SEQ ID NO:152).

30 OR99

LOCUS AF179720 481 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA137) gene, partial cds.

ACCESSION AF179720

KEYWORDS

35 SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

40 REFERENCE 1 (bases 1 to 481)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

45 REFERENCE 2 (bases 1 to 481)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..481
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>481

CDS /gene="PPA137"
 <1..>481
 /gene="PPA137"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LAICQPLRYPVLNMGRLLCTVLVAGAWVAGSIHGSIQATLTFR
 LKP
 YCGPNQVDYFICDIPAVRLACADTTVNELVTFVDIGVVAASCFCMLILLSYANIVHAI
 LKIRTTDGRRAFSTCGSHLTVVTVYYVPCIFYLRA
 GSKSPLDGAVAVFYTVVTPFL" (SEQ
 ID NO:153).
 10 BASE COUNT 89 a 139 c 116 g 137 t
 ORIGIN
 1 cctggcaata tgtcaacccc tcgcgtaccc agtgctcatg aatgggaggt tatgcacagt
 61 ccttgtggct ggagcttggg tcgcggcgc cattcatggg tctatccagg ccaccctgac
 121 ctccgccta cccttatgtg gccccaaatca ggttagattac ttatctgtg acatccctgc
 181 agtattgaga ctggcctgtg ctgacacaac tgtaatggc ttgtgaccc ttgtggacat
 241 cggagtagtg gcccgcagg gcttcatgtt aattctactt tcctatgcca acatagtcca
 301 tgccatctcg aagatacgca ccactgtatgg gaggcgccgg gccttctcta cctgtggc
 361 ccacctaact gtggtcacag tctactatgt tccctgtatt ttatctacc ttaggctgg
 421 ctccaagagc cccctggatg gggcagtggc tggttttac actgttgtca ctccattcc
 481 g (SEQ ID NO:154).

OR100

LOCUS AF179721 487 bp DNA PRI 31-DEC-2000
 25 DEFINITION Papio hamadryas olfactory receptor (PPA138) gene, partial cds.
 ACCESSION AF179721
 KEYWORDS .
 SOURCE baboon.
 ORGANISM Papio hamadryas
 30 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 35 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 40 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 45 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>487
 /gene="PPA138"
 CDS <1..>487
 50 /gene="PPA138"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLLYPVIMTNGLCIRLLVLSVGGFLHALIHEGILFRLT
 FCNSIIHHFYCDIPLLTISCTDPSINFLMLFILSGSIQVFTILTVELVSYAFVLFTI"

LKKKSVKGIRKAFSTCGAHLSVCLYYGPLLFMYVGPASPQADDQDMVECVFYTVIIP
FL" (SEQ ID NO:155).

BASE COUNT 117 a 106 c 74 g 190 t

ORIGIN

5 1 tgtagccata tgcaaaccctt tactttatcc agtgattatg accaatggac tggcatccg
61 gctattagtc ttgcatttg tagtggcgtt cttcatgccc ttaatccatg aaggcatttt
121 attcagatta accttctgtt attctaacaat aatacatcac tttactgtt acattatccc
181 attgttaacg atttccgtt ctgacccttc tattaatttt ttaatgtttt ttatTTTGT
241 tggtaata caggtattca ctatTTGAC tggcttgc tcttatgtat ttgcctt
10 301 tacaatctta aaaaaaaaagt cagtc aaagg cataaggaa gcctttcca cctgtggagc
361 ccacatcttc tctgtgtt tatacatgg ccccttctc ttcatgtatg tggccctgc
421 atctccacaa gcaatgttca aagatatggt agatgtgtt tttacactg tcatttcc
481 ttctta (SEQ ID NO:156).

15 OR101

LOCUS AF179722 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA139) gene, partial cds.

ACCESSION AF179722

KEYWORDS

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

30 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

40 gene <1..>487

/gene="PPA139"

CDS <1..>487

/gene="PPA139"

/codon_start=2

45 /product="olfactory receptor"

/translation="VAICNPLL YMVVVSRRLLVSLTYLYGFSTAIVVSPCIFSMS

YCSSNIINHFYCDIAPLLALSCSDTYLPEAIVFISAATNLVFSMITVLVSYFNIVLSI

LRMHSSEGRKKAFSTCASHMMAVTVFYGTMLFMYLQPQTNHSLTDKMASVFYTLVIP
ML" (SEQ ID NO:157).

50 BASE COUNT 110 a 111 c 85 g 181 t

ORIGIN

1 tgtggccatt tgtaaccctc tgctctacat ggtgggtgt tctcgccggc tctgcctct

61 gctggctcc ctacatacc tctatggctt ttatcgatc attgtggttt cacccatgtat

121 attctctatg tcttattgtt ctctaatat aatcaatcat tttactgtt atattgcacc

181 tctgttagca ttatcttgc ctgatactta cttaccagaa gcaatagtct tcataatctgc
 241 agccaacaat ttggttttt ccatgattac agttcttagta tcttatttc atattgttt
 301 gtccattcta aggatgcatt catcagaagg aaggaaaaaa gcctttcca ccttgcttc
 361 acatatgatg gcagtcacag ttttctatgg gacaatgctg ttcatgtatt tgccageccca
 421 aaccaaccac tcactggata ctgataagat ggcttctgtg ttttacacat tggtgattcc
 481 tatgctg (SEQ ID NO:158).

OR102

10 LOCUS AF179723 487 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA140) gene, partial cds.
 ACCESSION AF179723
 KEYWORDS
 SOURCE baboon.
 15 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 REFERENCE 1 (bases 1 to 487)
 20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..487
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>487
 /gene="PPA140"
 35 CDS <1..>487
 /gene="PPA140"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICFPPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
 FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI
 LKVPSSKGICKAFSTCGSHLSVVSFYGTIIGLYFCPSANSSTLKETVMGMMYTVVTP
 ML" (SEQ ID NO:159).
 BASE COUNT 82 a 141 c 108 g 156 t
 ORIGIN
 40 1 tggccatc tgctcccccc tgcactaac cgcgcacatgc agccccatgc tctgtctcg
 61 cctggggcg ctgtctggg tgcgtaccac ctccatgcc atgttacaca ctttactcat
 121 ggcagggtt gtttttgcg cagacaatgt gatccccac ttttctgtg atatgtctgc
 181 tctgtcaag ctggcctgct ctgacactcg agtcaatgaa ttggtgatat ttatcatgg
 241 agggtcttattt ctgtcatcc cttccctact catccctggg tccatgcac ggatgtctc
 301 ctccatcctc aaggccctt cgcttaaggg tatctgcaag ggcgttctcta ctgtggctc
 361 ccacccctct gtgggtgcac ttttctatgg gaccattatt ggctctact tctgccttac
 421 agtcaatagt tctactcaa aggagactgt tatgggtatg atgtacactg tggtgacccc
 481 catgctg (SEQ ID NO:160).

OR103

LOCUS AF179724 478 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA142) gene, partial cds.
ACCESSION AF179724
KEYWORDS
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 478)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..478
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>478
/gene="PPA142"
CDS <1..>478
/gene="PPA142"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLNYATIMSQPMCGFLMGVAGILGFVHGGIQTFLFIAQLP
FCGPNVIDHFMCDLVPLLEACTDTHTLGPLIAANGSLCFLIFSMLVASYVIILCSL
RTHISEGRHKALSSCTSHIFVVILFFVPCSYLYLRPLTSFPTDKAVTVFCTLFTPML"
(SEQ ID NO:161).
BASE COUNT 93 a 126 c 98 g 161 t
ORIGIN
1 tgtggccatc tgtaagccct tgaactatgc aaccatcatg agtcaaccctt ttttgtggatt
61 cctgatgggg gtggctggga ttctgggatt ttgtcatggaa gggatccaga ctctgttcat
40 121 agccagttt ccattctgtt gcctaatgtt catcgaccac ttatgtgtt atttagtacc
181 ttttcttagag ctggccttca cagacactca caccctgggg cctctgtatag ctggcaacag
241 tggatcattt tgtttccat tttttccat gctgggttgc tctttagtca tcattctgtt
301 ctccctaagg actcatatctt ctgaaggccgc tcacaaagctt ctgtctatgtt gtacccctca
361 tatctttgtt gtcatctttat ttcttgccc ttgttcatatc ctgtatctaa gacctctaa
45 421 ctccctcccc actgacaaag ctggactgt gtttgcacc ctattiacac ctatgttg (SEQ ID NO:162).

OR104

LOCUS AF179725 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA143) gene, partial cds.
ACCESSION AF179725
KEYWORDS
SOURCE baboon.
ORGANISM Papio hamadryas

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
 source 1..487
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>487
 /gene="PPA144"
 CDS <1..>487
 /gene="PPA144"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICQPLHYSTLLSPWACMAMVGTWLTGIIATTAAFLIFSLP
 FPSRPIIPHFLCDILPVRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
 LAMASTQSRRKVFSTCSSHLLVVSLFFGTASITYIRPQAGSSVTTDRVLSDLFYTVITP
 ML" (SEQ ID NO:165).
BASE COUNT 85 a 184 c 95 g 123 t
ORIGIN
 1 ttttgcacat tgccaggcctc tgeactaactc taccctcttg agccccatggg cctgcatggc
 61 catggtgggc acctccctggc tcacaggcat catcacggcc accaccatg ccttcctcat
 121 cttctctcta cttttccca gcccggccaaat catccccacac ttctctgtg acatccgtcc
 181 agtaactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
 241 ttagtgtctc attatgatcc ccttctctct gattgtcacc ttccatccatc gcacatccctggg
 301 agcccatccata gcgatggcct ccacccagag ccggccgaaag gtcttcata cctgctccctc
 361 ccatctgcctc gtggctctc tttctttgg aacagccgc atcacctaca tccggccgca
 421 ggcaggctcc tctgttacca cagaccgcgt ctcagtcctc ttctacacgg tcacatcacacc
 481 catgctc (SEQ ID NO:166).

OR106

LOCUS AF179727 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR183) gene, partial cds.
ACCESSION AF179727
KEYWORDS
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CN
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487

0
9
8
7
6
5
4
3
2
1
0

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        /organism="Pan troglodytes"
        /db_xref="taxon:9598"
5      gene      <1..>487
        /gene="PTR183"
      CDS       <1..>487
        /gene="PTR183"
        /codon_start=2
        /product="olfactory receptor"
        /translation="VAICFPLHYTAIMSPMLCLSVVTLWVLTTFHAMLHTLLMARLC
10    FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGILIVVIPFLLILGSYARIVSSI
        LKVPSSKGICKALSTCGSHLSVSLFYGTIVIGLYLCPANSSTLKDTVMAMMYTVVTP
        ML" (SEQ ID NO:167).
      BASE COUNT   86 a   137 c   105 g   159 t
      ORIGIN
15      1 tgtggccatc tgttcccccc tgcaactacac cgccatcatg agccccatgc tctgtctc
        61 cgtggtagcg ctgtctggg tgctgaccac ctteccatgcc atgttacaca ctttactcat
        121 ggccagggttg tggtttgtg cagacaatgt gatccccac ttttctgtg atatgtctgc
        181 tctactgaag ctggcctgtct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
        241 agggctcatt gtgtcatcc catcctact catccctggg tcctatgcaa gaatttgtctc
        301 ctccatcctc aaggccctt ctcttaaggg tatctgcaag gcctgtcta ctgtggctc
        361 ccacctgtct gtgggtgtcac tttctatgg gaccgttatt ggtctctact tatgcccata
        421 agctaataatg tctactctaa aggacactgt catggctatg atgtacactg tggtgacc
        481 catgtcg (SEQ ID NO:168).

```

OR107

LOCUS AF179728 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR203) gene, partial cds.
ACCESSION AF179728
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..487
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
50 gene <1..>487
 /gene="PTR203"
 CDS <1..>487
 /gene="PTR203"
 /codon_start=2
 /product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLSVVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGIVVIPFLILGSYARIVSSI
LKVPSKGICKALSTCGSHLSVSLFYGTIGLYLCPSANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:169).

5 BASE COUNT 85 a 137 c 106 g 159 t

ORIGIN

1 tgtggccatc tgttcccccc tgcactacac cgccatcatg agccccatgc tctgtctc
61 cgtgggtcg ctgtccggg tgctgaccac ctccatgcc atgttacaca cttaactcat
121 ggccagggtg tggttttg cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatgg
241 agggtcttattt gttgtcatcc catcctact catcctggg tccatgcaa gaattgttc
301 ctccatcctc aaggccctt ctctaaggg tatctgcaag gccttgtcta ctgtggctc
361 ccacctgtct gtgggtcac ttttctatgg gaccgttattt ggtctactat tttttttt
421 agctataatgt tctactctaa aggacactgt catggctatg atgtacactg tgggtacccc
481 catgtcg (SEQ ID NO:170).

OR108

20 LOCUS AF179729 485 bp DNA PRI 31-DEC-2000

DEFINITION Pan troglodytes PTR204 pseudogene, partial sequence.

ACCESSION AF179729

KEYWORDS

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485

/organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>485

/gene="PTR204"

/pseudo

40 BASE COUNT 130 a 107 c 77 g 171 t

ORIGIN

1 tgtggccata tgtaatccct tgctttatcc agtgatgatg tccaaacaac tcagcgctca
61 gttgtcaagc attccatatg taattgggtt cctgcaccc ctgggtcatg tgaggtaact
121 attgcgacta actttctgca ggttaacat aatacattt ttctactgtg aaattttaca
181 actgtcaaa atttcatgca atggccatc tattaaacgca ctaatgatat ttattttg
241 tgctttata caaataccca cttaatgac gatcataatc ttcttataatc gtgtgtcttt
301 tgatattctg aaaaaaaaaagt ctgaaaaggg cagaagaaaa gcctctcca catgcagcgc
361 ccatctgttctgtcat ttt
421 atctggctta gctgaagagacc cagacaaagt gtattcttttt acacgatt ataattcccc
481 tgcta (SEQ ID NO:171).

OR109

LOCUS AF179730 487 bp DNA PRI 31-DEC-2000
5 DEFINITION Pan troglodytes olfactory receptor (PTR205) gene, partial cds.
ACCESSION AF179730
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
15 Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
25 gene <1..>487
/gene="PTR205"
CDS <1..>487
/gene="PTR205"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLCYSTVTRPQVCALMLALCWVLTNIIALTHTFLMARLS
FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVVLGGTVLIVPFLCIVTSYIHIVPAI
30 LRVTRRGVGKAFSTCSSHLCVVCFYGTLFSAYLCPPSIASEEKDIAAAAMYTIVTP
ML" (SEQ ID NO:172).
35 BASE COUNT 83 a 148 c 110 g 146 t
ORIGIN
1 tgtggccatt tgccgcccc tctgctactc cacagtcacg aggccccaa tctgtgccct
61 aatgcttgca ttgtgctggg tcctcaccaa tatcattgcc ctgactcaca cgttccctcat
40 121 ggctcggtt tccitctgtg tgactggga aattgctcac ttttctgtg acatcactcc
181 tgtccctgaag ctgtcatgtt ctgacaccca catcaacgag atgtgggtt ttgtcttggg
241 aggcaccgta ctcatcgcc ccttttatg cattgtcacc tcttacatcc acatttgtcc
301 agctatccgtt agggtccgaa cccgtgggg ggtggggcaag gcctttcca cctgcagttc
361 ccacctctgc gtgttttgtg tgttctatgg gacgccttc agtgcctacc tttgtccctcc
421 ctccattgcc tctgaagaga aggacattgc agcagctgca atgtacacca tagtgactcc
481 catgtt (SEQ ID NO:173).

OR110

LOCUS AF179731 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Pan troglodytes olfactory receptor (PTR206) gene, partial cds.
ACCESSION AF179731
KEYWORDS .
SOURCE chimpanzee.

ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 487)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 15 source 1..487
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>487
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 CDS <1..>487
 /gene="PTR206"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYSTIMALRLCASLVAAPWVIAILNPLLHTLMMALH
 20 FCSDNVIIHFFCDINSLLPLSCSNTSLNQLSVLATVGLIFVVPSVCILVSYILIVSAV
 MKVPSAQGKLKAFSICGSHIALVLIFYGAITGVYMSPLSNHSTEKDSAASVIFMVVAP
 VL" (SEQ ID NO:174).
 BASE COUNT 90 a 138 c 91 g 168 t
 ORIGIN
 25 1 cgtggccatc tgtcacccct tacattactc caccattatg gccctgcgcc tcttgtccct
 61 tcttgtagct gcacccctgg tcattgccc ttggaaacct ctcttgcaca ctctttatgtat
 121 ggcccatctg cacttctgct ctgataatgt tatccaccat ttcttctgtat atatcaactc
 181 tctcccccct ctgtccgtt ccaacaccag tcttaatcag ttggatgttc tggctacgg
 241 gggctgtatc ttgggttac ctccatgtt tatccctggta tcttatatcc tcttttttc
 301 tgctgtatg aaagtccctt ctgccccagg aaaactcaag gttttctcta tctgtggatc
 361 tcacccgtcc ttggatcc ttttctatgg agcaatcaca ggggtctata tgagcccc
 421 atccaatcac tctactgaaa aagactcagc cgcacatcagg atttttatgg ttgttagcacc
 481 tgtgttg (SEQ ID NO:175).

40 OR111

LOCUS AF179732 487 bp DNA PRI 31-DEC-2000
 DEFINITION Pan troglodytes olfactory receptor (PTR207) gene, partial cds.
 ACCESSION AF179732
 45 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 487)
 50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 5 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
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 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 10 gene <1..>487
 /gene="PTR207"
 CDS <1..>487
 /gene="PTR207"
 /codon_start=2
 15 /product="olfactory receptor"
 /translation="VAVCNPLLYTVAMYQRLCSLLVATSYCWGRVCSTLTYFLLELS
 FRGNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLVITLTSYAFIFITV
 MKTASIGGRKKAFFTCASHLTAITIFHGTLFLYCVPNSSWLMVKVASVFYTVVIP
 ML" (SEQ ID NO:176).
 20 BASE COUNT 99 a 122 c 103 g 163 t
 ORIGIN
 1 tgtggcgtg tgtaaccctc ttctctacac agttgcaatg taccagaggc ttgttcctt
 61 gttggggct acatcatact gttggggag agtctgtcc ctgacactta cctactttct
 121 actggaaatta tccttcagag gaaataaatat cattaataac ttgtctgtg agcatgctgc
 181 catttgtgc gtgttgtgc ctgaccctta tgtgagccag gagatcactt tagttctgc
 241 cacattcaat gaaataagca gcctggtgat cactctcaact tcctatgttttca
 30 301 cactgtcatg aagacggctt ccattgggg ggcgaagaaa gcgttctca cgtgtgcctc
 361 ccacttgacg gccattacca tttccatgg gactattttt tcctctact gtgtcccaa
 421 ctccaaaagt tcgtggctca tggcaaggt gcctctgtc tttcacacag tggcattcc
 481 catgctg (SEQ ID NO:177).

OR112

LOCUS AF179733 481 bp DNA PRI 31-DEC-2000
 35 DEFINITION Pan troglodytes olfactory receptor (PTR208) gene, partial cds.
 ACCESSION AF179733

KEYWORDS

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 481)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 481)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..481

/organism="Pan troglodytes"

121 attgcgacta actttctgca ggttaacat aatacattat ttctactgtg aaatttaca
181 actgtcaaa atttcatgca atggccatc tattaacgca ctaatgatat ttatttgg
241 tgctttata caaatcccc cttaatgac gatcataatc tcttattctc gtgtgcctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaa gcctctcca catcagcgc
361 ccatctgtt tctgtctcat tgtactacgg aactctgatc ttcatgtatg tgctgcctgc
421 atctggctta gctgaagacc cagacaaagt gtattctctg tttcacacga ttataattcc
481 cctgcta (SEQ ID NO:183).

OR115

LOCUS AF179736 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR211) gene, partial cds.
ACCESSION AF179736
KEYWORDS
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR211"
CDS <1..>487
/gene="PTR211"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLRYTVLMNIHFCGLLILLSRFMSTM DALVQSLMIFQLS
FCKNVEIPLFFCEVVQVVIKLA CSDTLINNILIYFASSIFGAIP LSGIIFSYSQIVTSV
LRMPSARGKYKAFSTCGCHLSVFSLYGTAFGVSIS SAVA ESSRITA VGSV MYT VVPQ
MM" (SEQ ID NO:184).
BASE COUNT 102 a 120 c 98 g 167 t
ORIGIN
1 tggccatt tgccacccac tgaggtacac agtccatg aacatccatt tctggggctt
61 gctgattctt ctctccagg tcatgagcac tatggatgcc ctgggtcaga gtcgtatgat
121 attcagctg tcctctgca aaaacgttg aatccccttg ttctctgtg aagtcgttca
181 ggtcatcaag ctgccttgtt ctgacaccct catcaacaac atccatat atttgcaag
241 tagcatattt ggtgcaattc ctctctgtt aataatttc tcttattctc aatagtcac
301 ctctgttgtt agaatgcatc cagcaagagg aaagtataaa gctgtttcca cctgtggctg
361 tcaccctctt gttttccct tttctatgg gacagctttt ggggtgtcca ttgttctgc
421 tggcgttag tctcccgaa ttactgctgt ggggtcagtg atgtacactg tggteccaca
481 aatgatg (SEQ ID NO:185).

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 484)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 5 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 484)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..484
 15 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>484
 /gene="HLA121"
 /pseudo
 20 BASE COUNT 88 a 145 c 118 g 133 t
 ORIGIN
 1 tgtggctatc tgccctgccgc ttaggtatcc agagctcatg agtgggcaga cctgcatgca
 61 gatggcagca ctgagctggg ggacaggctt tgccaactca ctgctacagt ccatcccttgt
 121 ctggcgccctc cctttctgtg gccacaacgt catcaaccac ttttctgtg agatcttgcc
 181 agtgcataaaa ctggcctgtg gggacatctc cctcaatgcg ctggcattaa tggtggccac
 241 agctgtccctg acactggccc ccctcttgc catctgcctg ttttacccctt tcatcttgcc
 301 tgccatccctt agggttaccctt ctgctgcagg ccggcgcacaa gccttctcca cctgctcagg
 361 ccacccatca gttgtgttgg ttttttaagg gacaatttcc ttcatgtact tcaaaccacca
 421 ggcacaggac cccaaacgtgg ataagattgt tgcaattgtt tatgggttg tgacaccctc
 481 gctg (SEQ ID NO:188).

OR118

LOCUS AF179739 487 bp DNA PRI 31-DEC-2000
 35 DEFINITION Hylobates lar olfactory receptor (HLA122) gene, partial cds.
 ACCESSION AF179739
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 45 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Hylobates lar"

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/db_xref="taxon:9580"
gene      <1..>487
/gene="HLA122"
CDS       <1..>487
/gene="HLA122"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLLYTVAMSQRLCSLLVATSYSWGIVCFLTLYFLELS
FRGNNIINNFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITV
MKMPSTGGRKKAFSTCASHLTAITIFHGTLFPYCVPNSKSSWLMVKVTSVFYTVFIP
MV" (SEQ ID NO:189).
BASE COUNT    101 a   124 c   97 g   165 t
ORIGIN
1 tgtggcggtg tgtaaccctc ttctctacac agttgaatgc tccagaggc ttgctccct
61 gttgggtggct acatcataact ctggggggat agtctgttc ctgacactta cctactttct
121 actggaaatta tcccttcagag gaaataataat cattaataaac ttgtctgtg agcatgctgc
181 catttgttgcgt gtgtcttgct ctgaccctta tgtgagccag gagatcaattt tagtttctgc
241 cacattcaat gaaataagca gtctgtatgat gatttcaact tcctatgtttt tcatttttat
301 cactgtcatg aagatgcctt ccactggggg gcgcaagaaa gcgttctcca cgtgtgcctc
361 ccacctgacc gccattacca ttcccattgg gactatccctt ttcccctact gtgttccctaa
421 ctccaaaagt tcatggctca tggtcaagggt gacctctgtc tttcacacag tggtcattcc
481 catggtg (SEQ ID NO:190).

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OR119

LOCUS AF179740 486 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA123) gene, partial cds.
 ACCESSION AF179740
 KEYWORDS
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
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 /db_xref="taxon:9580"
 gene <1..>486
 /gene="HLA123"
 CDS <1..>486
 /gene="HLA123"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHT"

FCADHIIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVV~~T~~IYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
M" (SEQ ID NO:191).

5 BASE COUNT 95 a 144 c 93 g 154 t

ORIGIN

1 tgtggccatc tgtcacccct tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtgct gggcctggg tcatcgcttgc tgcgtgtgc ctttgcata cccctccct
121 ggcccagtt tcctttgtc ctgaccacat catccctac ttcttctgtc accttggc
181 cctgctcaag ttgtcctgtc cagatacctc cctcaatcatc ttggcaatct ttacagcagg
241 attgacagcc attatgcctc cattttgtc catcctggtt tcttatggtc acattggggt
301 caccatcctc cagattccct ctaccaaggg catatgcaaa gccttgcca ctggatc
361 ccacctcta gtggacta tctattatgg gacaattatt ggctctatt ttctcccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgtt (SEQ ID NO:192).

15

OR120

20 LOCUS AF179741 487 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar olfactory receptor (HLA124) gene, partial cds.

ACCESSION AF179741

KEYWORDS

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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/organism="Hylobates lar"

/db_xref="taxon:9580"

40 gene <1..>487

/gene="HLA124"

CDS <1..>487

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/product="olfactory receptor"

/translation="VAICSPFHYPVIMNQRTRAKLAAASWFPGFPATVQTTWLFSP

FCGTNKVNHFCDSPPVRLVCADTALFEIYAVGTLVVMIPCLLILCSYTHIAAI

LKIPSAKGKNKAFSTCSSHLLVVSFLYISLSLTYFRPKSNNNSPEGKKLLSLSYTVVTP

ML" (SEQ ID NO:193).

50

BASE COUNT 102 a 141 c 96 g 148 t

ORIGIN

1 tgtggccatc tgttagccct tgcactaccc agtcatcatg aaccaaagga ctctgtccaa
61 actggctgct gcctcctggt tccaggctt tcctgttagct actgtgcaga ccacatggct
121 cttagttt ccattctgtc gcaccaacaa gttaaaccac ttcttctgtc acagccggcc

181 tgtgtctgagg ctggctgtc cagacacagc actgttttag atctacgcca tcgtcgaaac
241 cattctgggt gtcatgtacc ctgcgttgc gatcttgtt tcctatactc acattgtcgc
301 tgccatccctc aagatccccat cggtctaaagg gaagaataaaa gccttctcta cgtgttcttc
361 acacccttc tttctatatac atcattaagc ctcacatatt ttccggctaa
421 atcaaataat tctccgttgg gcaagaagct gctatcatttgc tcctactatg ttgtgactcc
481 catgttg (SEQ ID NO:194).

OR121

LOCUS AF179742 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA125) gene, partial cds.
 ACCESSION AF179742
 KEYWORDS
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA125"
 CDS <1..>487
 /gene="HLA125"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYLNIMNRRVCILLVFTSWLISFLIFPALMLLLKLD
 YCRSNIIDHFTCDYFPLLQLACSDTKLEVMAFSCAVFTLMFTLALISLSYIYIIRTI
 LRIPSTSQRTKAFSTCSSHMVVVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP
 MM" (SEQ ID NO:195).
 BASE COUNT 121 a 107 c 82 g 177 t
 ORIGIN
 1 tgfgccatc tgcaaggcctc tgcatattt gaatatcatg aatcgaagag tctgcatact
 61 gcttgtttt acttcggc tgatttcatt cttaatcata ttccctgcac tcattgtgt
 121 cttaaagctt gattactgtt ggtctaataat tattgaccat ttacccgtt attattttcc
 181 cctgtcgaa ctggcgtttt cagacacaaaa attcttagag gtgtatggcat ttcttggtc
 241 ttttgttttacttgcata cttggcatt aatatctgtt tcctacatatacattatcc
 301 aacaatttt agaattccctt ctactagtca gaggacaaaaag gcctttcca catgttttc
 361 ccacatgggtt gttatttcca tctcttatgg cagctgcatt ttatgttaca tttaaaccc
 421 agcaaaaat agaggtgtcc ttgagcaaggg agtggcaata ctaaacacctt cagtagcccc
 481 catgtatg (SEQ ID NO:196).

OR122

LOCUS AF179743 484 bp DNA PRI 31-DEC-2000
5 DEFINITION Hylobates lar olfactory receptor (HLA126) gene, partial cds.
ACCESSION AF179743
KEYWORDS
SOURCE common gibbon.
ORGANISM Hylobates lar
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
25 gene <1..>484
/gene="HLA126"
CDS <1..>484
/gene="HLA126"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAISWILSCASSLSHTLLLTRL
30 FCAANTIPHFCDLAALLKLSCSDFLNELVMFTVGVVVITLPFMCLVSYGYIGATI
LRVPSTKGHIKASTCGSHLSVVSLYYGSIFGQYLFPTASSSIDKDVIDVAVMYTVITPM
L" (SEQ ID NO:197).
35 BASE COUNT 88 a 143 c 104 g 149 t
ORIGIN
1 tgtggccata tgtcaccctc tccactacac tgtcatcatg aggaaagacg tctgtgttt
61 cttagtggct atatcttgga ttctgtcttg tgccagctcc ctcttcaca cccttctct
40 121 gaccggctg tcttctgtg ctgcgaacac catccccccac gtcttctgtg accttgctgc
181 cctgctcaag ctgtctgtct cagatatctt cctcaatggat ctggatgtt tcacatgg
241 ggtgggttc attaccctgc cattcatgtt tatcctggta tcataatggat acatggggc
301 caccatccctg agggccctt caaccaaagg gatccacaaa gcttccacgt gtggctcca
361 tctttctgtg gtgtctctt attatgggtc aatattggc cagttttt tcccgaccgc
421 aacggatcc attgacaagg atgtcatgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:198).

OR123

LOCUS AF179744 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Hylobates lar olfactory receptor (HLA127) gene, partial cds.
ACCESSION AF179744
KEYWORDS
SOURCE common gibbon.
ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 5 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 15 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA127"
 CDS <1..>487
 20 /gene="HLA127"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLAQLS
 FCADHIIPHFFCDLGALLKLSCTSLSNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQIPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:199).
 BASE COUNT 95 a 143 c 94 g 155 t
 ORIGIN
 30 1 tgtggccatc tgtcacccctc tacatttatgc caccatcatg agtcagagcc agtgtgtcat
 61 gctggtgct gggccctggg tcatcgcttg tgcgtgtgc ctttgcata ccctccct
 121 ggcccagctt ccctttgtg ctgaccacat catccctcac ttcttctgtg accttggtgc
 181 cctgcctaag ttgcctgtc cagataacctc cctcaatcag ttggcaatct ttacagcagg
 241 attgacagcc attatgcctc cattcttgtc catctgggtt ttctatggtc acatgggg
 301 caccatctc cagatccct etaccaaggg catabcataaa gctgtgtcca ttgtggatc
 361 ccacctctca gtggtgacta tctattatgg gacaattatt ggctctatt ttctcccc
 421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacagag tagtcactcc
 481 catgttg (SEQ ID NO:200).

OR124

40 LOCUS AF179745 484 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA128) gene, partial cds.
 ACCESSION AF179745
 45 KEYWORDS
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 484)
 50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
10 /gene="HLA128"
CDS <1..>484
/gene="HLA128"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICHPLHYTVMREELCVFLVAWSWILSCASSLSHTLLLTRL
FCAANTIPHVFCDLAALLKLSCSDIFLNEVMFTVGVVVITLPFMCLVSYGYIGATI
LRVPSTKGIHKASTCGSHLSVSVSLYGSIFGQYLFPТАSSIDKDVIDVAVMYTVITPM
L" (SEQ ID NO:201).

20 BASE COUNT 87 a 143 c 105 g 149 t

ORIGIN
1 tgitgccata tgcacccctc tccactacac tgcacatcatg agggaaagagc tctgtgtctt
61 cttagtggct gtatcttgg a ttctgtcttg tgccagetc cccttcaca cccttcct
121 gaccggctg tctttctgtg ctgcgaacac catccccac gccttcgtg accttgctgc
181 cctgtcaag ctgtctgtc cagatatat cctcaatggat ctggcatgt tcacagttag
241 ggttgtggtc attaccctgc cattcatgtg tatcctggta tcataatggct acatggggc
301 caccatccctg agggccctt caaccaaagg gatccacaaa gcttccacgt gtggctccca
361 tctttctgtg gtgtctctt attatgggtc aatatttggc cagttttt tcccgaccgc
421 aaggagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:202).

OR125

LOCUS AF179746 484 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar olfactory receptor (HLA129) gene, partial cds.

35 ACCESSION AF179746

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Hylobates lar"

/db_xref="taxon:9580"

gene <1..>484
 /gene="HLA129"
 CDS <1..>484
 /gene="HLA129"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLAQLS
 FCADHIIPHFFCDLGALLKLSCSDTFLNELVMFTVGVVVITLPFMCLILVSYGYIGATI
 LRVPSTKGIHKASTCGSHLSVSVSLYGSIFGQYLFPASSIDKDVIDAVMYTVITPM
 L" (SEQ ID NO:203).
 5
 BASE COUNT 85 a 139 c 111 g 149 t
 ORIGIN
 1 tgtggccatc tgtcacccctc tacatttatgc caccatcatg agtcagagcc agtgtgtcat
 61 gctgggtgctt gggccctggg tcatcgcttg tgccgtgtctt ctttgcata ccctccct
 121 ggcccagctt ccttttgtc ctgaccacat catccctcac ttctctgtc accttgggtc
 181 cctgctcaag ttgcctgtc cagatacctt cctcaatggat ctgggtatgt tcacagttagg
 241 ggtgggtgtc attaccctgc cattcatgtg tatccctggta tcatatggct acatggggc
 301 caccatccctg agggtccctt caaccaaagg gatccacaaa ggttccacgt gtggctccca
 361 tctttctgtc gtgtctctt attatgggtc aatatttggc cagttttt tccccaccgc
 421 aaggcgttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacaccat
 481 gttg (SEQ ID NO:204).
 10
 15
 20
 25
 30
 35
 40
 45
 50

OR126

LOCUS AF179747 486 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar HLA130 pseudogene, partial sequence.
 ACCESSION AF179747
 KEYWORDS
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /gene="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>486
 /gene="HLA130"
 /pseudo
 BASE COUNT 95 a 142 c 94 g 155 t
 ORIGIN
 1 tgtggccatc tgtcacccctc tacatttatgc accatcatga gtcagagcca gtgtgtcatg
 61 ctgggtgtc ggtccctgggt catcgcttg gcgtgtgtc tttgcatacc cctccctcg
 121 gcccacattt ccttttgtc tgaccacatc atccctact tttctgtga ctttgggtcc

181 ctgctcaagt tgtcctgctc agataacctcc ctcaatcagt tggcaatctt tacagcagga
 241 ttgcacagcca ttatgttcc attcttgtc atccgggtt cttatggta cattggggtc
 301 accatcctcc agattccctc taccaggc atatgcaaag ccttgtccat ttgtggatcc
 361 cacctcttag tggtgactat ctatattggg acaattattg gtctctattt tcctccccca
 421 tccagcaaca ccaatgacaa gaacataattt gcttcagtga tatacacagt agtactccc
 481 atgttg (SEQ ID NO:205).

OR127

10 LOCUS AF179748 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA131) gene, partial cds.
 ACCESSION AF179748
 KEYWORDS .
 15 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA131"
 CDS <1..>487
 /gene="HLA131"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICRPLYYPVIMKPHLCGLLVLVSWFLSLSYSLIQSLLMLRVS
 FCTSWVIQHFYCELAQVLTACSDTHINYILLYMVTGLGFVPFSGILFSYTQIVSSI
 30
 35
 40

LRISSPDGKHKAFTCGSHLSVSLFYGTGLGVYLSSNASSSWRGMVASVMYTVVTP
 NV" (SEQ ID NO:206).
 BASE COUNT 80 a 145 c 106 g 156 t
 ORIGIN
 45 1 tggccatc tgtecccccc tgacttaccc tgcatacatg aaacctcacc tctgtggcct
 61 gctggttctt gtgtctgtt ccctcagctt gtcataactcc ctgtatccaga gtctgttgat
 121 gctcgccgtt tcctctgca ccagttgggt cattcagcac tttaactgtg agcttgcata
 181 ggtcccaeg ctgcctgtct cagacacaca catcaattac atccgtctt acatggtgac
 241 cggcccttgc ggcttgc ctttcaggat gatccctttc ccctacaccc aaatcgatc
 301 ctccatctgtt agaatctcat ccccaagatgg gaaacacaaa gcctttcta cctgtggatc
 361 tcatctgtct gtggttctt tattctatgg gacaggtttt ggcgtgtatc ttgttccaa
 421 tgcatacgcc tcttcctggc gggcatggt ggctcggtt atgtacactg tggtaacccc
 481 caatgtg (SEQ ID NO:207).

OR128

LOCUS AF179749 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA132) gene, partial cds.
5 ACCESSION AF179749
KEYWORDS
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
25 gene <1..>487
/gene="HLA132"
CDS <1..>487
/gene="HLA132"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLAQLS
30 FCADHIIPHFFCDLGALLKLSCTSLSNQLAIFTAGLTAIMPLFLCILVSYGHIGVTI
LQTPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:208).
35 BASE COUNT 95 a 144 c 94 g 154 t
ORIGIN
1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtggct gggccctggg tcatcgcttg tgcgtgtgct cttttgcata ccctccctc
40 121 ggcccagctt tcctttgtg ctgaccacat catccctcac ttcttctgtg accttgggtgc
181 cctgctcaag ttgcctgtct cagataccctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgccttc cattcttggc catcctgggt tcttatggc acattgggt
301 caccatccctc cagactccctc ctaccaaggg catatgcaaa gcctgtcca ttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattattt ggctcttatt ttcttcccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgtt (SEQ ID NO:209).

OR129

LOCUS AF179750 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO100) gene, partial cds.
50 ACCESSION AF179750
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla

DRAFT 24/2/60

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 5 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
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 15 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>487
 /gene="GGO100"
 CDS <1..>487
 20 /gene="GGO100"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTFIMDQNTCIQLAVISWSSFLCSMVINVLTSLP
 YCGPNILNHFFCEVPTVRLSCTDTSFTELVVIFSIIVFIPFLLIVVSYVRILQSV
 LRMRSASGRYKALSTCTSHTVVTLYGTAIMYMRPQSRSWAGGKIIAVFYTVVTP
 ML" (SEQ ID NO:210).
 BASE COUNT 91 a 130 c 97 g 169 t
 ORIGIN
 30 1 tgtagccatt tgtcatcctc ttcaattatac ctccattatg gaccaaaca cctgcattca
 61 actggcaggta atttcttggt ccagtagctt cctgtgttcc atggttatca atgttcac
 121 gttgagttt ccctactgtg ggctaatat cctgaatcac ttttctgtg aggtacctac
 181 tgccctgagg ttgttttgcga ccgacaccc attcacggag ctggtgttt ttatcttcag
 241 tatcatcatt gtcttcattcc ctccctctt cattgtgtt tcctatgtcc ggatccctca
 301 atctgttctc aggatgcggc cagccctccgg gcggtataag gcattatcca cctgtaccc
 361 ccatttgaca gtggtaacct tattttatgg gactgccatc ctcatgtaca tgagaccaca
 421 gtcgagggtt tcctgggctg gcccgaatg cattgcgggtt ttctacacgg tggtcacacc
 481 catgttt (SEQ ID NO:211).
OR130
 40 LOCUS AF179751 488 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla GGO101 pseudogene, partial sequence.
 ACCESSION AF179751
 KEYWORDS
 45 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 488)
 50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..488
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>488
/gene="GGO101"
/pseudo

10 BASE COUNT 91 a 144 c 113 g 140 t

ORIGIN

15 1 tgtggccatt agccacccac ttcaactatcc catcctcatg aatcagaggg tctgtctcca
61 gattaccggg agtcctggg cctttggat aatcgatggc ttgtatccag atgggtggtag
121 taatgaattt cccctactgt ggcttgagga aggtgaacca ttcttctgt gagatgtat
181 ccttgtgaa gctggcctgt tgtagacacat ccctgttga gaagggtgata ttgccttgct
241 gtgtcttcat gcttcttc ccatttcca tcatcggtc ctccatgtct cgcatctag
301 ggactgtgtc geaaatgcac ttgtgtcagg cctggaaaaa ggcctggcc acctgtctt
361 cccacctgac agctgtcacc ctcttctatg gggcagccat gtcatctac ctgaggccata
421 ggcgttaccg ggcggccage catgacaagg tggctctat ctctacaca gtccttactc
481 ccatgtctg (SEQ ID NO:212).

25 OR131

LOCUS AF179752 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO102) gene, partial cds.

ACCESSION AF179752

30 KEYWORDS

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 487)

35 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

40 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

45 FEATURES Location/Qualifiers

source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO102"
CDS <1..>487
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/codon_start=2
/product="olfactory receptor"
/translation="VVICHPLHYTVIMREEFCVFLVAWSWILSCASSLSHTVLLTQLS

FCAANTIPHVFCDLAALLKLSCSDIFLNEVMFTVGVVVITLPFMCLVSYGYIGATI
LGPVPSTKGIHKALSTCGSHLSVSVSLYGSIFGQYLFPTVSSFIDKDVIVALMYTVVTP
TL" (SEQ ID NO:213).

5 BASE COUNT 87 a 137 c 106 g 157 t

ORIGIN

1 tgttgtcata tgccacccctc tccactacac tgtcatcatg agggaaaggt tcttgtcctt
61 cttagtgct gtatcttgc ttctgtcttgc tgccagctcc ctcttcaca ccgttctcct
121 gaccccaagtc tcttctgtgc ctgcgaacac catccccat gcctctgtgc accctgtgc
181 cctgctcaag ctgtctgtc cagatatctt cctcaatgag ctggcatgt tcacagttag
241 ggtgggtgtc attaccctgc cattcatgt tatcctggta tcatatggtt acattggggc
301 caccatcctg ggggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctt gtgggtgtc tctattatgg gtcaatattt ggccagtttacccac
421 tgtaaggcgt ttatttgaca aggatgtcat tggtgtc tgcacacgg tggcacacc
481 cacgttg (SEQ ID NO:214).

15

OR132

20 LOCUS AF179753 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO103 pseudogene, partial sequence.

20

ACCESSION AF179753

KEYWORDS

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

25

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

30

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

35

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

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source 1..488

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

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/gene="GGO103"

/pseudo

BASE COUNT 86 a 149 c 108 g 145 t

ORIGIN

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61 gataaccatg ttgtcttgc tcctgggtgc agctgacggg ctcatgcagg ctgttgcac

121 cctgagcttc ccatattgcgc gtgcacacga gatcgatcac ttcttgcgc aggccccgt

181 gctgttcat ttggcttgcgt ctgacacatc agtcttcgaa aacgcgtatgt acatctgtc

241 tggtaatgc ttccgtgtcc ccctttccctt catctgtcc tcctatggc tcatccgtc

50

301 tggttctgtc cacatgcgtt ctacagaagc ccgcaagaag gcctttgcca cctgcttcc

361 acattggctt gtggggac tctttatgg agctgccatt ttacatata tgagacccaa

421 atcccacagg tccactaacc acgataaggt tggcagcc ttctatagta tggcacccc

481 ttactaa (SEQ ID NO:215).

OR133

LOCUS AF179754 458 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO104 pseudogene, partial sequence.
5 ACCESSION AF179754
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..458
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
25 gene <1..>458
/gene="GGO104"
/pseudo
BASE COUNT 89 a 139 c 88 g 142 t
ORIGIN
30 1 ccaccatcat gagtcacagc cagtgtgtca tgctgggtggc tgggcctgg gtcacgttt
61 gtgcgtgtc tctttgtcat accctccctcc tggcccggtt tccttcgt gctgaccaca
121 tcatccccca cttcttctgt gacctgggtg ccctgctcaa gttgcctgc tcagacac
181 ccctcaatca gtagcaatc ttacagcag gattgacagc cattatgtttt ccattegt
241 gcatctgtt ttcttatgtt cacattgggg tcaccatctt ccagattccc tctaccaagg
301 gcatatgcaa agccttgcc acttgtggat cccacacttc agtgggtgact atctattatg
361 ggacaattat tggctcttat ttcttcccc catctgcaa caccaatgac gagaacataaa
421 ttgcctcagt gatatacaca gtagtcactc ccatattg (SEQ ID NO:216).

OR134

40 LOCUS AF179755 477 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO106) gene, partial cds.
ACCESSION AF179755
KEYWORDS
45 SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 477)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 477)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
5 FEATURES Location/Qualifiers
source 1..477
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>477
/gene="GGO106"
CDS <1..>477
/gene="GGO106"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAIRKPLHYLVIMRQWVCVLLVMSWVGGLHSVFQLSIIYGLP
FCGPNVIDHFFCDMYPLLKLVCTDTHVIGLLVTNGGLSCTIVFLLLISYGVILHSL
KKLSQKGRQKALSTCSSHITVVVFFFVPCIFMYARPARSFPIDKSVSFYTVPML"

(SEQ ID NO:217).

BASE COUNT 100 a 108 c 100 g 169 t

ORIGIN

1 tgtggccatc cgtaagccct tgcatattt ggttatcatg agacaatggg ttttgttgc
61 gctgctggta atgcctggg ttggaggatt tctgcactca gtattcaac ttgcattat
121 ttatggctc ccattctgtg gccccaaatgt cattgatcac ttttctgtg acatgtatcc
181 ctattgaaa ctggctcgca ctgacaccca ttttattggc ctcttagtgg tgaccaaattgg
241 aggactgtt tcactattt ttttctgtc ctacttcattt tttatggtg tcatcttgca
301 ctctctaag aaaccttagtc agaaaaggag gaaaaagcc ctctcaacct gcagttccca
361 catcaactgtg ttgtcttc tttttttcc ttgtatttt atgtatgcta gaccgtctag
421 gagttcccc attgacaaat cagtgagtgt ttttataca gtcataaccc caatgt (SEQ ID NO:218).

OR135

LOCUS AF179756 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla olfactory receptor (GGO107) gene, partial cds.

ACCESSION AF179756

KEYWORDS

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

40 REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

45 REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..488

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>488

5 CDS /gene="GGO107"
 <1..>488
 /gene="GGO107"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LAICYPLHYGAMMSSLLSVQLALGSWVCGFMAIAVPTALISGLS
 FCGPRAINHFFCDIAPWIALACTNTQAVELVAFVIAVVVILSSCLITLVSYVVIISTI
 LRIPSASGRSKAFSTCSSHTVVLIWYGSTIFLHVRTSIKDALDLIKAVHVLNTVVTP
 VL" (SEQ ID NO:219).
 10 BASE COUNT 84 a 155 c 108 g 141 t
 ORIGIN
 1 tcttgcacat tgctatccct tacactacgg agccatgtatc agtagcctgc ttcgtatgc
 61 gtggccctg ggctcctggg ttgtggttt catggccatt gcagtgccta cagccctat
 121 cagtgccctg tcctctgtg gccccctgtc catcaaccac tcttctgtg acattgcacc
 181 ctggattgcc ctggcctgca ccaacacaca ggcagtagag ctgtggct ttgtgtatgc
 241 tggtgtggttt atccctgaggat catgcctcat cacccttgtc tccatgtgt acatcatcg
 301 caccatccctt aggatcccct ctggccagtgg ccggagcaaa gccttctcca cgtgcctc
 361 gcatatcacc gtggtgctta ttggtatgg gtccacaatt tcccttcacg tccgcaccc
 421 tatcaaagac gccttggatc tgcataaagc tgtccacgtc ctgaacactg tggtgactcc
 481 agttttaa (SEQ ID NO:220).

OR136

LOCUS AF179757 480 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla GGO108 pseudogene, partial sequence.
 ACCESSION AF179757
 KEYWORDS
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 480)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 480)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..480
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>480
 /gene="GGO108"
 /pseudo
 BASE COUNT 95 a 125 c 101 g 159 t
 ORIGIN
 1 tgtggcggtg tgtaaccctc ttctctacac agttgcaatg tcccagaggc tttgtccctt
 61 gttggggct acatcatact gttgggggac agtcgttcc ctgacaccta ctttctactg
 121 gaattatcct tcagaggaaa taatatcatt aataacttgt tctgtgagca cgctgtcatt
 181 gttgtctgtgt ctggctctga cccctatttg agccaggaga tcacttttagt ttctgcacaac

241 attcaatgaa ataaggcggcc tggtgatcat tctcacitcc tatgtttca ttttatcac
301 tgtcatgaag acgccttcca ctggggggcg caagaaagcg ttctccacgt gtgcctccca
361 cttagcggcc attaccattt tccatggac tatcctttc ctctactgtg ttctaactc
421 aagtgcgg ctcatggta aggtggcgc tgctttgc acagtggta ttccatgtg (SEQ ID NO:221).

5

OR137

LOCUS AF179758 487 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO109) gene, partial cds.
ACCESSION AF179758
KEYWORDS
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO109"
CDS <1..>487
/gene="GGO109"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSHSQCVMLVAGSWVIACACALLHTLLARLS
FCADHIIIPFFCDLGALLKLSCSDTSNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:222).
40 BASE COUNT 95 a 148 c 93 g 151 t
ORIGIN
1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcacagcc agtgtgtcat
61 gctgggtgc gggctctggg tcatcgctg tgctgtgc ctgtgcata ccctctcc
121 gccccggc ttccctctgtc ctgaccacat catccctcac ttctctgtc accctgggtc
181 cctgctcaag ttgcctgtc cagacaccc cccaaatcatc ttacagcagg
241 attgacagcc attatgcctc cattcctgtc catccctggg ttctatggc acattgggt
301 caccatccctc cagatccctc ctaccaaggg catatgaaaa gccttgcctt ctgtggatc
361 ccacccctca gtggtgacta ttattatgg gacaattatt ggtctctatt ttctcccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catttg (SEQ ID NO:223).

OR138

LOCUS AF179759 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA1) gene, partial cds.
ACCESSION AF179759
KEYWORDS
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA1"
CDS <1..>487
/gene="HSA1"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYPVMMSNKLSAQLLSISYVIGFLHPLVHSLLLRLT
FCRFFNNHYFYCEILQLFKISNGPSINALIIFIGAFIQIPTLMTHIISYTRVLFDI
LKKKSEGRSKAFSTCGAHLLSVSLYYGTLIFMYVRPASGLAEDQDKVYSLFYIIIP
LL" (SEQ ID NO:224).

35 BASE COUNT 131 a 105 c 77 g 174 t
ORIGIN

1 tgtagccata tgtaatccct tgctttatcc agtgatgatg tccaacaaac tcagcgctca
61 gttgctaagt atttcatatg taattggttt cctgcacatct ctgggtcatg tgaggttact
121 attgcgacta actttctgca ggttaacat aatacattt ttctactgtg aaattttaca
181 actgttcaaatttcattgca atggccatc tattaaacgca ctaataatat ttattttgg
241 tgctttata caaataccctttaatgac tatcataatc ttttataatc gtgtgtctt
301 tggatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcggcgc
361 ccacatctgttctgtcat ttttacatgg aactctgatc ttcatgtatg tgctgttgc
421 atctggctta gctgaagacc aagacaaaatgttattctgtt ttttacacgatataattcc
481 cctgcta (SEQ ID NO:225).

OR139

50 LOCUS AF179760 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA10) gene, partial cds.
ACCESSION AF179760
KEYWORDS
SOURCE human.
ORGANISM Homo sapiens

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
10 /gene="HSA12"
CDS <1..>487
/gene="HSA12"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLAFSDRVNEWVIFIMGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKALSTCGSHLSVSLFYGTIVIGLYLCSSANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:228).

20 BASE COUNT 85 a 141 c 103 g 158 t

ORIGIN

1 tgtggccatc tgctcccccc tgcactacac cgccatcatg agccccatgc tctgtctcg
61 cctggggcg ctgtctggg tgctgaccac cttccatgcc atgttacaca ctttactcat
121 gcccagggtg tgtttttgta cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctgtgaag ctggccttct ctgacactcg agttaatgaa tgggtgatat ttatcatgg
241 agggtcatt ctgtcatcc cattcctact catcctggg tcctatgaa gaattgtctc
301 ctccatcctc aagggtccctt ctcttaaggg tatctgaaag gccctctca ctgtggctc
361 ccacctgtct gtgggtcac tggatggg accgttatt ggtctctact tatgtctatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacc
481 catgctg (SEQ ID NO:229).

OR141

LOCUS AF179762 486 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens HSA13 pseudogene, partial sequence.

ACCESSION AF179762

KEYWORDS

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>486
/gene="HSA13"
/pseudo
5 BASE COUNT 108 a 139 c 96 g 143 t
ORIGIN
1 cgtggctgtg tgtaaccccc tcctctatgc catagtcatg acaccaatga cccgcctggc
61 gctgctggcc gggcatatt ctggccat agicaattct gtgatctgca ctggctgcac
121 ctctctatc tcctctcta agtccaacca ttagacttc ttttctgtg accctccacc
181 cctgctgaag ctgcctgtg gtgaaaccag gccacggaa tgggtatct acctctcagc
241 tttctggc atcacaacca gcattcagt gattttaca tctgtacttgt tcattttca
301 gtctattctg aagattcgtg cagcagggg aaagccaaga ccttctccac ctgtctct
361 cacaagactg cattgactct ctcttgga acactcatat tcatatactt gaaaggcaac
421 atggcgaaat cccttgagga agacaagatc gtgtcaatat ttacactgt ggtcatcccc
481 atgta (SEQ ID NO:230).

15 OR142

LOCUS AF179763 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA16 pseudogene, partial sequence.
20 ACCESSION AF179763
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
25 Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
30 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
35 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
40 gene <1..>487
/gene="HSA16"
/pseudo
BASE COUNT 111 a 110 c 96 g 170 t
ORIGIN
45 1 catggccatt gtgaaccctt tactttatc agtagatctg actaaaatag ttgttattgt
61 gctgcattt gggcatgtt tgggaggttt aatcagctca ttgacacata caattggctt
121 ggtgaaactg tcttctgtg gcccaaatgt catcagtcac ttcttctgtg atctccccc
181 actgttgaag ctgtcatgtt ctgagacatc tatgaatgaa ttgttgc ttgttctc
241 tggcattt ggcacgctca ctttttgac tgggtgtatct tcattgtgc
301 tgctatctg aggatccgct aagaaggcagg tagacgtaa gccttctcca cctgcacctc
361 tcacctgtt accgtgacct tattctatgg atcgataagc tttagttaca tttagccaa
421 ctcccaatgtatccatgtt aagaaaatgtt ggtgtctgtt ttatatacc ttgtgggtcc
481 tatgtt (SEQ ID NO:231).

OR143

LOCUS AF179764 485 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA18 pseudogene, partial sequence.
5 ACCESSION AF179764
KEYWORDS
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Homo sapiens"
/db_xref="taxon:9606"
25 gene <1..>485
/gene="HSA18"
/pseudo
BASE COUNT 90 a 116 c 106 g 173 t
ORIGIN
30 1 cggtggccatc tgtaacccac tgggtacac ggtcaccatg tctccccaga agtgtttgc
61 cctttactg ggtgtctatg ggatggggat ttggggctg tggctcatat gggaaacata
121 atgtttatgt cctttgtgg agacaacacctt gtcaatcaat atatgtgtga catccttc
181 ctcccttgagc tctcctgcaa cagctttac ataatttgc tgggtttt tattattgt
241 accgttggca ttgggttgcc gattgtcacc atttttcctt cttatggttt tattttttcc
301 acgattctcc acatttagtc cacagaggc aggtctaaag cttcagtac ctgcaggttcc
361 cacataattg tggtatcgct ttcttgggt caggtgcctt catgtaccc aaaccaccc
421 ctattctacc ctggaccag gggaaagtgt cttccatgg tttactgct gtgggtgc
481 tgg (SEQ ID NO:232).

40 OR144

LOCUS AF179765 486 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA2 pseudogene, partial sequence.
ACCESSION AF179765
45 KEYWORDS
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
5 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Homo sapiens"
/db_xref="taxon:9606"
10 gene <1..>486
/gene="HSA2"
/pseudo
BASE COUNT 88 a 117 c 107 g 174 t
ORIGIN
15 1 cgtgggcac tctaaccac tggtaaacac ggtcaccatg tctcccaaga tgtgtttgc
61 cctttactg ggtgctatg gggggggat ttggggctg tggctcatat gggaaacata
121 atgttatgt cttttgtg agacaacatt gtcaatcact atatgtgtga catccttct
181 ctcttgagc cccctgcac cagcttac ataaatttc tggtggttt tattatttg
241 accgtggca tttgggtgcc gattgtcacc attttctctt cttaggtttt tattttcc
30 301 accatttc acataggatc cacagaggc aggctaaag cttcagtac ctgcaggcc
361 cacataattt tggtatcgat ttctttggg tcaggtgc tcatgtaccaaaaccac
421 tctatttac ccctggacca ggggaaatgt tcctccattt ttgtactgc tggtggcccc
481 atgttt (SEQ ID NO:233).

25 OR145

LOCUS AF179766 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA3) gene, partial cds.
ACCESSION AF179766
30 KEYWORDS
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
35 REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
40 REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA3"
50 CDS <1..>487
/gene="HSA3"
/codon_start=2
/product="olfactory receptor"

/translation="VAICKPLHYVVIMNNRVCTLLVLCCWVAGLMIVPPLSLGLQLE
FCDSNAIDHFSCDAGPLLKISCSDTWVIEQMVLMAVFALIITPVCVILSYLYIVRTI
LKFPSPVQQRKKAFSTCSSHMIVVSIAYGSCIFIYIKPSAKDEVAINKGVSVLTSVAP
LL" (SEQ ID NO:234).

5 BASE COUNT 114 a 113 c 97 g 163 t
ORIGIN

1 tgtggccatc tgtaaacccc ttcaattatgt ggtcatcatg aacaacaggg tgtgtacctt
61 attagtctc tgctgtggg tggctggctt gatgatcatt gtccaccac tttagcttagg
121 cctccagctc gaattctgtg actccaatgc cattgatcat tttagctgtg atgcaggc
181 tctccctaaag atctcatgtc cagatacatg ggtatatagaa cagatggta tacttatggc
241 tgatttgca ctcaattatca cccagtttg tggtttctg tcctacttgt acatagtc
301 aacaattctg aagttccctt ctgttcagca aaggaaaaag gcctttcta cctgttcate
361 ccacatgatt gtggttcca ttgcctatgg aagctgcac ttcatactata tcaagccctc
421 tgccaaagat gaggtggcca taaataaagg agtttcagtt cttaactactt ctgtcgacc
481 ctgttg (SEQ ID NO:235).

OR146

20 LOCUS AF179767 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA5) gene, partial cds.
ACCESSION AF179767
KEYWORDS
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
40 /db_xref="taxon:9606"
gene <1..>487
/gene="HSA5"
CDS <1..>487
/gene="HSA5"
45 /codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVTWILSCASSLSHTLLLTRL
FCAANTIPHVFCDLAALLKLSCSDIFLNEVMFTVGVVVITLPFMCLVSYGYIGATI
LRVPSTKGIGHKALSTCGSHLSVVSLYYGSIFGQYLFPVVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:236).
50 BASE COUNT 88 a 141 c 105 g 153 t
ORIGIN
1 tgtggccata tgccacccctc tccactacac tggtcatcatg aggaaagagc tctgtgtctt
61 cttagtggct gtaacttggaa ttctgtcttg tgccagctcc ctctctcaca cccttctcct

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

15 /organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>488

/gene="HSA7"

/pseudo

20 BASE COUNT 95 a 141 c 103 g 149 t

ORIGIN

1 catggccatc tgcaagccct ttttatatgg aagcaaaatg accagggttg tctgcctctg
61 tctggctgct gctccctata ttatggctt tgcaaatttgt ctaagcacag accaccctga
121 tgcctcgct gtccctctgt ggacccaatg acatcaacca ctttactgt gcggaccac
181 ccctcttagt ctcgcctgc tcagatactt atgtcaaga gaccgcatg ttggtggtgg
241 ctggtccaa ctcatttgc tcctcaccg tcatcctcat tcctacact tcatctca
301 ctgcattctt gcttatccac actgctgagg ggaggcgcaa ggccttctcc acctgcgggt
361 ctcatgtac cgctgtact gtctctatg ggacactgtt ctgcgtac ctgaggcccc
421 ctcttgagac atctatacaa caggggaaaa ttgtagctgt tttttatatc ttgtgagtc
481 cgatgtta (SEQ ID NO:239).

OR149

35 LOCUS AF179770 487 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens olfactory receptor (HSA8) gene, partial cds.

ACCESSION AF179770

KEYWORDS

SOURCE human.

ORGANISM Homo sapiens

40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

45 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"
 gene <1..>487
 /gene="HSA8"
 CDS <1..>487
 /gene="HSA8"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTSIMNRKLCTLLVLCAWSGFLTIFPPLMLLLQLD
 YCASNVIDHFACDYFPLLQLSCSDTWLLEVIGFYFALVTLLFTLALVILSYMYIIRTI
 LRIPSASQRKKAFSTCSSHMIVISISYGSCIFMYANPSAKEKASLTKGIAILNTSVAP
 ML" (SEQ ID NO:240).
 BASE COUNT 115 a 119 c 80 g 173 t
 ORIGIN
 1 tgttgccatc tgcaagcccc ttcaattcac acatccatcatg aacaggaaac tctgcactct
 61 acttgcgtc tggcctggc taagtgggtt tctgaccatt ttcccacccc ttatgcctct
 121 cctccagctg gattactgtg ctccaacgt cattgatcac ttgcattgtg actattttcc
 181 cctttacaa ctatctgtt cagatacatg gtccttagaa gtaattgggtt ttatctttgc
 241 ttggttact ttgcgttca ctgtgcatt agtattttta ctttacatgt acattatcg
 301 gaccatitg agaatcccgta ctggcagtc aaaaaaaaaag gctttctcca ctgttcttc
 361 tcacatgatt gtcatttcca ttctttatgg aagctgtata ttcatgtatg ctaatccatc
 421 tgcaaaaagaa aaggccatcat tgacaaaagg aatagctatt ctaatacat ctgtgcccc
 481 catgtg (SEQ ID NO:241).

OR150

LOCUS AF179771 485 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU145) gene, partial cds.
 ACCESSION AF179771
 KEYWORDS .
 30 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 485)
 35 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 485)
 40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 45 source 1..485
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>485
 /gene="EFU145"
 50 CDS <1..>485
 /gene="EFU145"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICQPLQYSTAMSHQLCALMLAMCWLLTNCPALM"

FCAQRAIPHFYCDPSALLKLACSDTRINELMIIAMGLAFLTVPLTLIVFSYVRISWAV
LGISSPGGRCKAFSTCGSHLTVVLLFYGSLMGVYLLPPSSYSTERESRAAILYMVIIIP
M" (SEQ ID NO:242).

5 BASE COUNT 78 a 155 c 114 g 138 t

ORIGIN

1 tgtggccatc tgccagccac tccaatacag cacagctatg agtcaccaggc tctgtgcact
61 catgctggcc atgtgctggc tgctaaccaa ctgtcctgca ttgatgcaca cgctgttgct
121 gacccgtgt gccttctgtg cccagaggc catccccac ttcatactgt atcccagtgc
181 tctcctgaag ctcgcctgct cggatacccg cataaacgag ctgtatgtca tcgcccattgg
241 ctggccttc ctacagggtc ccctcacgtc gategtttc tcctacgttcc gcatctctg
301 ggctgtgtt ggcacatctgt ctccctggagg gcgatgcaaa gccttctcca cctgtggttc
361 tcatctacg gtgggtctgc tcttctatgg gtccttatg gggtgttatt tgcttctcc
421 gtcatcttac tctacagaga gggaaaggcag ggctgccatt ctctacatgg tgatcattcc
481 catgt (SEQ ID NO:243).

15

OR151

LOCUS AF179772 485 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU146 pseudogene, partial sequence.

20 ACCESSION AF179772

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

25 REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

30 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..485

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

40 gene <1..>485

/gene="EFU146"

/pseudo

BASE COUNT 98 a 145 c 110 g 132 t

ORIGIN

45 1 cgttggccatc tgcaagcccc tccactaccc ggtgttcatg agcaggcaggc tctgcacaca
61 gctcatcctc gctgctggc tggcagggtt ctccatcatttgccttgc tcatcctgac
121 cagtcaatgtt ccattctgtg acaccacat caaccacttc ttctgtact atacacccct
181 aatggaggtg gtcgtcactg ggccaaagggt gctggagatg gtggattta ccctggccct
241 ggtggcaccg ctcagcacct tgggtctgtat caccctgtcc tacatccaga tcacccac
301 gatgtcagg atccccctgt tccaggagag gaaaaagggt ttctccacct gttccccc
361 tgtatgtgtt gttaccatgt gctatggaaa gctgtttttt taatgtatgtc aagccccc
421 caggcaaaagg ggtgtatcta aacaaaggag tgcgtctaat caatacaggatttggcccc
481 tcttg (SEQ ID NO:244).

OR152

LOCUS AF179773 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU147) gene, partial cds.

5 ACCESSION AF179773

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

25 gene <1..>487

/gene="EFU147"

CDS <1..>487

/gene="EFU147"

/codon_start=2

/product="olfactory receptor"

/translation="VAICLPLHYTMVKPRCCLMLVAASWLCSHCLAFSLTLLMTQFS
FCASHSIQHFFCDVPPLLKACSDTHIFQVTMLTEGVLSGVIPLTCVLVSYAHIMHTI
LRIPSAGGKHKVFSTCGSHLSVVTLYGTLFLVYFQPSSSYSADTGMVACVVYTMVTP
MV" (SEQ ID NO:245).

35 BASE COUNT 86 a 161 c 93 g 147 t

ORIGIN

1 cgtggccatc tgcccttc tgcactacac catggcatg aaaccccgat gtcgcctgat

61 gctgggtggca gcatcctggc tctgctccca ctgcctggct ttctctctca cccttctgat

121 gactcagttc tcattctgtg cctcccattc catccaacac ttttctgtg atgtaccccc

40 181 actcctcaaa ctgcctgtt cagacaccca tatctttcag gtcacaatgt taactgaagg

241 agtcctctca gggtgtatcc ctcttacctg tgcctggc tcttatgcc acatcatgca

301 caccatcctc aggatccctt ctgctgggg caagcacaaa gtctctcta cctgtggctc

361 tcacctgtca gggtcactc tctctatgg gaccctttt ctggtgatt tccagcctc

421 atccctctac tcagcagata ctggaatggt ggcatgtgt a tatacacga tggcacccc

45 481 catggtg (SEQ ID NO:246).

OR153

LOCUS AF179774 487 bp DNA PRI 31-DEC-2000

50 DEFINITION Eulemur fulvus olfactory receptor (EFU148) gene, partial cds.

ACCESSION AF179774

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
15 /organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU148"
CDS <1..>487
20 /gene="EFU148"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYVAIMSNTVCRLVFCCWVAGLFIIIPPLSLGLNLE
FCDSDTIDHFICDASPLLNISNTWFMEQTVIICAVALTLIMTLMCVVLSYIYIIKTI
LGFSSAQKKAFFSTCSSHMIVVSITYGSYIFIYIKPSAKEEVAINKGVTVLTTSIAP
ML" (SEQ ID NO:247).
25 BASE COUNT 118 a 118 c 88 g 163 t
ORIGIN
30 1 tgtggccatc tgcaaaccgc tgcattatgt ggccattatg agtaacacag tctgcagaag
61 acttgtcttt tggtgtggg tagctggct gtttattata atccctccac ttagccctgg
121 cctaaatctg gaattttgtt attctgatac cattgatcat ttatctgtg atgcacatc
181 cctcctgaat atctcttgtt caaataacttg gtcatgaa cagactgtt acatctgtc
241 agtgcgtacc ctcattatga cacttatgt tgtagttctg tcctacattt atatcatca
301 gacaattttt ggattctttt ctggccagea aaagaaaaaa gcctttcca cctgttctt
361 ccacatgatt gtgggttcca tcacctatgg cagctacatc ttcatctata tcaaaccctt
421 tgcaaaggaa gaagttagcca ttaacaaggg tggacagtc ctcactactt ccacgc
481 catgctg (SEQ ID NO:248).

OR154

40 LOCUS AF179775 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU149) gene, partial cds.
ACCESSION AF179775
KEYWORDS
45 SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
10 /gene="EFU149"
CDS <1..>487
/gene="EFU149"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSLIVFPALMLLLKLD
YCGFNIIDHFTCDYFPLLQLSCSDTKLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
ML" (SEQ ID NO:249).

20 BASE COUNT 109 a 113 c 91 g 174 t

ORIGIN

1 tgttgtatc tgtaagcccc tgcatcatttggc ggtcatcatg aatcgaaaggatctgcacact
61 gctcggtttt cccttgcgc tggtttcatt cttaatcgta ttcccgacac tcattttcc
121 cttaaaggctt gattactgtg gatttaatat tattgaccat ttacctgttg attattttcc
181 cctcgctgcag cttccctgtt cagataccaa attccctggag ataatgggggt ttcctgtgc
241 tggtttact ctaatgttca ctttgcatt aatatttctg tcctatgc acatgttag
301 aacgattttg agaattccctt ctactgtca gaggacaagaa gcctttcta catgttcttc
361 ccacatgatt gtcatcttca tctcttatgg cagctgcatt ttatgtaca ttaagccctc
421 agcaaaggat agagttatctt tgagcaaggc agtggctgtg ctaatcacctt cagtagctcc
481 catgctc (SEQ ID NO:250).

OR155

LOCUS AF179776 484 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU150 pseudogene, partial sequence.

ACCESSION AF179776

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>484
/gene="EFU150"
/pseudo
5 BASE COUNT 80 a 157 c 112 g 135 t
ORIGIN
1 tctggctatc tgctatcc tacactacgg gacaatcatg agcagcctgc tggctgcaca
61 gctggccttg ggctctggg tctgtggtt cctggccatt gcagtgcata cgcccattat
121 cagtgccctg tccttcgttg gcggccgtgc catcaatcac ttcttcgttg acattgcacc
181 ctggatcgcc ctggcctgtta ccagcacaca ggcaatagag ctctggcctt tttgtgattgc
241 ttttgtggtc atcctgaggat catgcctcat caccctggtc tcctacgtgt acattatcg
301 caccatccctc aggatcccat ctgcccacgg cggagcaag ccttcctac gtgctccct
361 cacccatcccg tggtgcctat ctggatggg tccacgatt tccttcatgt ccgcacccct
421 atcacagacg ccttggatct gaccaaagct gtccatgtcc tgaacaccgt ggtgactcca
481 gttc (SEQ ID NO:251).

15 OR156

LOCUS AF179777 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU151) gene, partial cds.
ACCESSION AF179777
KEYWORDS
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
40 gene <1..>487
/gene="EFU151"
CDS <1..>487
/gene="EFU151"
/codon_start=2
/product="olfactory receptor"
/translation="LAICYPLHYRTIMSSLATQLALGSWVCGFLAIAVLTLISGLS
FCGARAINHFFCDIAPWIALACTSTQAIELVAFVIAFVVLSSCLITLVSYVVIISTI
LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSITDALDLTKAVHVLNTVVTP
VL" (SEQ ID NO:252).
50 BASE COUNT 83 a 159 c 110 g 135 t
ORIGIN
1 tctggctatc tgctatcc tacactacag gacaatcatg agcagcctgc tggctacaca
61 gctggccttg ggctctggg tctgtggtt cctggccatt gcagtgcata cgcccattat
121 cagtgccctg tccttcgttg gcggccgtgc catcaaccac ttcttcgttg acattgcacc

181 ctggattgcc ctggcctgca ccagcacaca ggcaatagag ctcgtggcct ttgtgattgc
241 ttttgtggc atcctgaggc catgcctcat caccctggc tccctacgtgt acattatcg
301 caccatccctc aggatcccat ctgcccggc cccggagaaa gccttctcta cgtgtcc
361 tcacccacc ttgggtgtca tctggatgg gtccacgatt ttcttcatg tccgeaccc
421 catcacagac gccttggatc tgaccaaagc tgtccatgtc ctgaacaccc tggtgactcc
481 agttctta (SEQ ID NO:253).

OR157

10 LOCUS AF179778 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU153) gene, partial cds.
ACCESSION AF179778
KEYWORDS .
SOURCE Eulemur fulvus.
15 ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
25 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
30 /organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU153"
CDS <1..>487
35 /gene="EFU153"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLKLD
YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
40 LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
ML" (SEQ ID NO:254).
BASE COUNT 109 a 113 c 91 g 174 t
ORIGIN
45 1 tggatctatc tgtaagcccc tgcattacag ggtcatcatg aatcgaaagag tctgcacact
61 gctcgctttt gcctttggc tgggttcatt cttaatcgta ttcccgacac tcatgttgc
121 cttaaagctt gattactgtg gattaatat tattgaccat ttacatgtg attattttcc
181 cctcgctgeag cttccctgtt cagataaaaa attccctggag ataatgggt ttccctgtgc
241 tggatctact ctaatgttca ctttgcatt aatatttctg tcctacatgc acatgttag
301 gacgattttg agaattccctt ctactagtca gaggacaaaag gcctttctta catgttcttc
361 ccacatgatt gtcatctcca tctcttatgg cagctgcatt ttatgtaca ttaagccctc
421 agccaaagat agagttatctt tgagcaaggc agtggctgtg ctaatcacctt cagtagctcc
481 catgctc (SEQ ID NO:255).

OR158

LOCUS AF179779 488 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU154) gene, partial cds.

5 ACCESSION AF179779

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

25 gene <1..>488

/gene="EFU154"

CDS <1..>488

/gene="EFU154"

/codon_start=2

30 /product="olfactory receptor"

/translation="MAICHPLRYPVFMNHRVCLFLASGCWFLGSVDGFMLTPITMTFP

YCRSREIHHSFCEVPAVTTLSCSDTSLYEMILMYLCCVLMILLIPVTVISSSYSFILLTI

HRMGSAEGRKKAFATCSSHMTVVILFYGAAIYTMLPSSYHTPEKDMMVSVFYTILT

VL" (SEQ ID NO:256).

35 BASE COUNT 92 a 163 c 95 g 138 t

ORIGIN

1 catggccatc tgccatccgc tccgttaccc tgtttcatg aaccacaggg tgtgtcttt

61 cctggcatct ggctgctgg tccctggatc agtagatggc ttcatgtca ctccaatcac

121 catgaccttc ccctactgca ggtccccggaa gattcaccat tccttctcg aagtcccctgc

40 181 tggtaacgacg cttccctgtc cagacacaccc actctatgaa atgctcatgt acctgtgtcg

241 tggccatcg ctccatcc tcgtgacagt catttcaagc tcctattcat tcatttcct

301 caccatccac aggatgggct cagcagaggg ccggaagaag gcctttgcca cctgttccct

361 ccacatgacc gtggttatcc tcttctatgg ggccgccatc tacacctaca tgctccccag

421 ctccattaccac actcctgaga aggacatgtat ggtgtctgtc ttttatacca tcctaactcc

45 481 tggctaa (SEQ ID NO:257).

OR159

LOCUS AF179780 488 bp DNA PRI 31-DEC-2000

50 DEFINITION Eulemur fulvus EFU155 pseudogene, partial sequence.

ACCESSION AF179780

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>488

/gene="EFU155"

/pseudo

20 BASE COUNT 111 a 113 c 91 g 173 t

ORIGIN

1 tggctatc tgtaagcccc tgcattacaa ggtcatcatg aatcgaagag tcgtgcacac

61 tgctcgcttt tgcccttgg ctggttcat tcttaatcgt attcccagca ctcatgttg

121 tcttaaagct tgattactgt ggatattaata ttatggacca ttttacctgtt gatttttc

181 ccctgctgca gccttcgttgc tcaagatacaa aattcctggaa gataatgggg tttccctgt

241 ctgtgtttac tctaattgttc acttggcat taatatttc tgcctacatg cacatgtga

301 gaacgatttt gagaattctct tacttagtc agaggacaaa ggcctttct acatgttct

361 cccacatgt tgcatactcc atctttatgc agactgtcat ttttatgtac attaagccct

421 cagcaaaggaa tagagtatct ttgagcaagg cagttgtgt gctaattacc tcagtagctc

481 ccatgcac (SEQ ID NO:258).

OR160

35 LOCUS AF179781 486 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU156 pseudogene, partial sequence.

ACCESSION AF179781

KEYWORDS

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

45 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Eulemur fulvus"

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      /db_xref="taxon:13515"
gene      <1..>486
          /gene="EFU156"
          /pseudo
5   BASE COUNT    119 a   110 c   93 g   164 t
ORIGIN
      1 tgtggccatc tgcaagcccc tcgattatgt gaccgtcatg aacagcagag ttgcaggat
      61 tctcatcatc ttttgtggg tggctgggtt atgcataata atccctccat ttagctggg
      121 tttaaatcta aaatctgtg actctaatacat gattgtatcat ttgggttgcg atgcatttc
      181 cctggtaaa atctcatgtc cagacacatg gttcatggaa cagacggta tcatactgtc
      241 tgtgtgacc ctgaatatga ctctaacttg tttttctgtc tcatacgctt acatcatcaa
      301 gacaattttt agattccctt ctgtccagca aaggaaaaag gcctttcca cctgttccc
      361 ccacatgatt gtggttcca tcacctatgg cacgtgcatt ttcatctaca tgaatccatc
      421 agcaaaggaa gaagtgcaccg ttaataaagt agttcttg ctcatctt ctatttgtc
      481 acattg (SEQ ID NO:259).

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OR161

LOCUS AF179782 486 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur rubriventer ERU157 pseudogene, partial sequence.
 ACCESSION AF179782
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>486
 /gene="ERU157"
 /pseudo
 BASE COUNT 78 a 157 c 112 g 139 t
 ORIGIN
 1 cgtggccatc tgccagccac cccaaatacag cacagctatg agtccccagc tctgtgcact
 61 catgtcgcc atgtgtggc tgctaaccag ctgtcctgcg ttgatgcaca cgctgttgct
 121 gaccegtgtg gctttctgtg cccagaaggc catccccac ttctactgtg atcccagtgc
 181 tctcctgaag ctgcgttgcgatcccg cataaatgag ctgtatgtca tcgccccatggg
 241 cttgacgttc ctcactattc ccctcacact gatgttc tctactgtcc gcatctctgg
 301 ggctgtgtt ggcacatctgtt ctctggcg ggatgtcaag gccttctcca cctgtgggtt
 361 tcatctcaacg gtgggttc tcttctatgg gtctctttagt ggtgtgttatt tgcttcc
 421 gtcatcttac tctacagaga gggaaaggc gatgtccatcc tctacatgtt gatcattcc
 481 atgtta (SEQ ID NO:260).

OR162

LOCUS AF179783 484 bp DNA PRI 31-DEC-2000
5 DEFINITION Eulemur rubriventer ERU159 pseudogene, partial sequence.
ACCESSION AF179783
KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
15 Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Eulemur rubriventer"
25 /db_xref="taxon:34829"
gene <1..>484
/gene="ERU159"
/pseudo
30 BASE COUNT 123 a 103 c 94 g 164 t
ORIGIN
1 tgtggccatc tgcaacccac tgaggttatcc catcatcatg aacagggtgt tataagtgc
61 aatggctgca tggcttggg tcataaggcta tctgatctcc ttatgtcaaa cagtcggac
121 aatgatattg ctttctgtg gcaataatgt cattgtatcat attacctgtg agatcctggc
181 tcttaaactc atatgtctag atatttccat gaatgtgtt atcatggcag tggcaagtat
241 ttttatattg gtgatccctc tgctgttcat ttttatctcc tatgtattca tccctcttc
301 caccctgaga attaattctt ctgagggggag aaagaaaagcc ttgcaacct gttcagccca
361 cctgactgtg gtcatcttat tctatggttc agctctttt atgtacatga agcctaagtc
421 aaagtacaca aaagtatctg atgaaatcat tgcactgtct tacggagtag taaccccaat
481 gttg (SEQ ID NO:261).

40

OR163

LOCUS AF179784 487 bp DNA PRI 31-DEC-2000
45 DEFINITION Eulemur rubriventer olfactory receptor (ERU160) gene, partial cds.
ACCESSION AF179784
KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

DRAFT

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
5 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"
10 /db_xref="taxon:34829"
gene <1..>487
/gene="ERU160"
CDS <1..>487
/gene="ERU160"
15 /codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTTIMREELCTLLVAISWLLSCASSLSHTLLLTRL
FCAANVIPNFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFLCILVSYGYIGATI
LRVPSTKGICKALSTCGSHLSVVSLYYGAIFGQYLFPALSNSIDKDIIVAMMYTVVTP
ML" (SEQ ID NO:262).
20 BASE COUNT 91 a 143 c 104 g 149 t
ORIGIN
1 tggccata tgcaccctc tccactacac caccatcatg agggaaagagc tctgcacctt
61 attggggct atatccggc tcctgtcttg tgccagctcc ctctccaca cccttcct
121 gaccgggtcg tccttcgtg ctgctaattgt catccccaaac ttcttcgtg accttgctgc
181 tctgtcaag ctgtcctgtc cagacatctt cctcaatggc ctggcatgt ttacagttagg
241 gggtgggttc attacccgtc cattttatg tatctggta tcctacggct acattggggc
301 caccatccgtt agggccctt caaccaaagg gatctgaaa gcattatcca cgtgtgggtc
361 ccatctctct gtgggtctc tgtactacgg ggcaatattt gggcgttacc tttcccccage
421 attaagaat tccattgaca aggacatcat tggcatgt atgtacacgg tggcacacc
481 catgttg (SEQ ID NO:263).

OR164

35 LOCUS AF179785 475 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU161) gene, partial cds.
ACCESSION AF179785
KEYWORDS
SOURCE Eulemur rubriventer.
40 ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..475

50
40
30
20
10

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        /organism="Eulemur rubriventer"
        /db_xref="taxon:34829"
      gene    <1..>475
      CDS     <1..>475
        /gene="ERU161"
        /codon_start=2
        /product="olfactory receptor"
        /translation="VAICKPLHYMNIMSRQLCHLLVAGSWLGGFLHSIIQIFITIQSP
FCGPNVIDHYFCDLLPLFKLACTDTFVEGLTVLANSGLIPVCSLFILVSSYIILVHL
RKHSAEGRHKALSTCASHITVVILFFGPAIFLYMRPSSTFTEDKLMGVLYTVITPS" (SEQ ID
NO:264).
      BASE COUNT   92 a   133 c   97 g   153 t
      ORIGIN
      15  1 cgtggcaatc tgcaaggcctc ttcatatccat gaatattatg agtgcgtcaac tggtcacct
          61 tctgggtggct gggtccctggc tggggaggctt tcctactctt attattcaga ttttatcac
          121 catccaatcg cccttttgtg gtcccaacgt gattgaccac tacttctgtg acctcctgcc
          181 attattcaag ctgcctgca cggacacett ttagagggg ctgactgtgt tgccaaatag
          241 tggcttaatt cccgtgtgtc cccgtgttat cctggtgcc tcctatataca ttatctgtt
          301 gcacttgagg aaacattctg cagaggggag gcacaaagcc ctctctaccc ttgcctctca
          361 catcacggtg gtcattttgtt ttttggacc tgccatcttc ctctcatatgc gacccctc
          421 tacccatcaca gaagacaaac tcatgggtgtt gttgtacaca gtcacccccc ccagt (SEQ ID NO:265).

```

OR165

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      25  LOCUS AF179786 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU162) gene, partial cds.
ACCESSION AF179786
KEYWORDS
      30  SOURCE Eulemur rubriventer
      ORGANISM Eulemur rubriventer
          Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
          Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
      35  AUTHORS Giorgi,D.G. and Rouquier,S.P.
      TITLE The olfactory receptor gene repertoire in primates and mouse:
          Evidence for reduction of function in primates
      JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
      40  AUTHORS Giorgi,D.G. and Rouquier,S.P.
      TITLE Direct Submission
      JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
          1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
      45  source 1..487
          /organism="Eulemur rubriventer"
          /db_xref="taxon:34829"
      gene    <1..>487
          /gene="ERU162"
      CDS     <1..>487
          /gene="ERU162"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAISNPPLYVQAMPRKLCICFIICSYTGGFVNIAILTSNTFTLD

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FCGDNVIDDFFCDVPPLVKLACDVEGSYQAVLYFLLASNVISPAMLILASYVFIIAV
LVRSSRGRRLKAFSTCSSHLISVTLYYGSILYIYSRPSSSYSLERDKMVSTFYTVLFP
TL" (SEQ ID NO:266).

5 BASE COUNT 91 a 158 c 98 g 140 t

ORIGIN

1 tggccatc tccaaccccc cgttatgt tcaggccatg ccaaggaaac tgtgcatttg
61 ttcatatac ttttatactata ctggaggcgt tgtaatgca ataatattaa ccagcaacac
121 attcacgttg gattttgtg tgacaatgt catgacgac ttttctgtg atgtcccacc
181 cctggtaag ttggctgtg atgtggagg gagctaccag gctgtgtgt acttcctct
241 ggcctcaac gtcatctcc cggccatgt catctcgcc tcctacgtt tcatcatcgc
301 agcagtctg agggcccgct ccggccgggg ccgcctcaag gcctctcca cgtgcctcc
361 ccacgtatctgttatactacgg ctccattctc tacatctact ctcgccaag
421 ttccagctatccctcgaga gggacaaaat ggtcttacc tttagacccg tgctgttccc
481 cacgtc (SEQ ID NO:267).

15

OR166

LOCUS AF179787 478 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur rubriventer olfactory receptor (ERU163) gene, partial cds.

20

ACCESSION AF179787

KEYWORDS

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

25

REFERENCE 1 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

30

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35

FEATURES Location/Qualifiers

source 1..478

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

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gene <1..>478

/gene="ERU163"

CDS <1..>478

/gene="ERU163"

/codon_start=2

45

/product="olfactory receptor"

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FCGPNKLDASFYCDVPEVIKLACLDTYVVEVLMVTNSGLLSVCFLVLIFSYATILTL

RTRLHQGQSKAFSTCASHLMVVSLIFVPCVFYLRPFCFSVDKIFSVFYMVITPML" (SEQ ID

NO:268).

50

BASE COUNT 85 a 132 c 108 g 153 t

ORIGIN

1 tggccgtatgttaccgtt gacggcatg aaccggccatc tctgcattca

61 gttgggtttt ggctgtgtt gtgggggtttt catccactt gtacacagg ttatactgg

121 catccagctg ccctctgtg gccccaaatggacagt ttactgtg atgtcccaga

181 ggtcatcaag ctggcctgcc tggacaccta tgtggtagaa gtgctgatgg ttaccaacag
241 tggctgcta tccttgcct gccttttgtt ctgtatattc tcattatgcc ccatctgcac
301 caccctgaga actcgccctcc accaggccca gagcaaggcc ttctcacct gtgcctccca
361 cctaatggtg gcagccctga cttttgccc atgtgtattc atctacttga gcccttcgt
421 cagcttcctt gtggataaga tattctgtt gtttacatg gtgatcacac ctatgttgc (SEQ ID NO:269).

5

OR167

LOCUS AF179788 487 bp DNA PRI 31-DEC-2000
10 DEFINITION Eulemur rubriventer olfactory receptor (ERU164) gene, partial cds.
ACCESSION AF179788
KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
20 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
25 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
30 /organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/gene="ERU164"
CDS <1..>487
/gene="ERU164"
35 /codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTTIISTRVCILLVCSSLAGFLIFPPIILLQLD
FCASNIIDHFICDSSPILQLSCTNTHFELMAFCLAVVLMVTLVILSYTNIIRTI
LRIPSMSQRKKAFSTCSSHIIIVVSLSYGSCIFMYIKPSTRERVLSKGAVVVNTSVAP
40 LL" (SEQ ID NO:270).
BASE COUNT 116 a 116 c 79 g 176 t
ORIGIN
1 tggccatc tgcaaaccctt tcattacac aaccatcatt agcaccagggttttatcct
61 tcttgttgtt agctccctggc ttgcaggatt ctgtatccatc ttccaccaa taatcccttct
45 121 tctgcagtgt gacttctgtt cctccaatatt aattgtatc ttatctgtt attcttc
181 aattctgcag ctcttgtta caaacactca ctttcttagaa ctcatggcat ttgttttagc
241 cttgggtaca ctcatggtca ctttgaccctt agttattctc tcctatacaa atattatccg
301 gacaattcta agaattccctt ctatgagtc aaggaaaaaa gcctttccca ctgttcctc
361 ccatataataa gtgtttcccc tctcttatgg tagtgtatc tcataatcataa taaaggcttc
50 421 tacaaggaa agggtgactt taagcaaagg agtagctgtt gttataactt cagtggtcc
481 tcttttg (SEQ ID NO:271).

OR168

LOCUS AF179789 483 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU165 pseudogene, partial sequence.
5 ACCESSION AF179789
KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
25 gene <1..>483
/gene="ERU165"
/pseudo
BASE COUNT 98 a 144 c 108 g 133 t
ORIGIN
30 1 cgttgccatc tgcaagcccc tcactacccc ccgtgctcat gagcagcagg gtctgcacac
61 agctcatcct cgcctgctgg ctggcagggt ttccttcat catttgccct gtcatcctga
121 ccagtcagct tcattctgt gacacccaca tcaaccacctt ttctgtgac tatacacctc
181 taatggaggt ggctctgcagt gggccaaagg tgcggatggat ggtggatttt accctggct
241 tggggcact gtcagcacc ttggtgctga tcaccctgtc ctacatccag atcatcagga
301 cgttgtcag gatccccctct gtcaggaga gaaaaaaggc ttctccacc tggccccc
361 atgtcatcggttaccatgt tgctatggaa gctgtttttatgtatgtc aagccctccc
421 caggcaaagg ggttcatcta aacaaaggag tgcctaattt aataacaattt tggccccc
481 ctt (SEQ ID NO:272).

40 OR169

LOCUS AF179790 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU167) gene, partial cds.
ACCESSION AF179790
45 KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
5 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
10 gene <1..>486
/gene="ERU167"
CDS <1..>486
/gene="ERU167"
/codon_start=2
15 /product="olfactory receptor"
/translation="VAICHPLRYTDIMTPRLCGLLVSLSLSICSADALLHSLMLLQLS
FCTDLEISLFFCEVVQVVKLACSDTLVNNLLIYFAACTLGGIPLSGIIFSYTQIATSI
LKMPSSGRKYKAFSTCGSHLSVVSFYGTGLGVYISSAVSDSSRTAVASVMYTVVTP
C" (SEQ ID NO:273).

20 BASE COUNT 83 a 139 c 107 g 157 t
ORIGIN

1 tgtggccatc tgtcacccctc tgagatacac agacatcatg actcctcgtc tgtgtggct
61 gctgggttca cttccctgtt ccatttgc tc cgccgatgcc ctgctccaca gcctcatgt
121 gctgcagctg ttcttcgtca cagacattga aatctccctt ttcttcgtg aagtgcgtca
181 ggtcgtaag ctgcgtgtc ccgataccct cgtcaacaac ttctgtatctt atttgcagg
241 ttgcacccctg ggtggccattc ctctgtctgg catcattttt ttttacactc aaatagccac
301 ctccattttt aaaaatggccgt catcgccgag aaagtataaa gcctttcca cctgtgggtc
361 tcacctgtca gtgtttccc ttgttatgg gacagggttg ggggtgtaca tcagttctgc
421 agtttctgac ttctcaagga ggactgcgggt ggcttcagtg atgtacactg tggtcactcc
481 ctgtt (SEQ ID NO:274).

OR170

35 LOCUS AF179791 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU168) gene, partial cds.
ACCESSION AF179791
KEYWORDS
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirrhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
45 Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur rubriventer"

DRAFT 24/2/98

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5           /db_xref="taxon:34829"
gene      <1..>487
          /gene="ERU168"
CDS       <1..>487
          /gene="ERU168"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAICHPLTYTDIMPRLCGLLVSLSLSCSADALLHSLMLLQLS
FCTDLEISLFFCEVVQVVKLACSDTUVNNLLIYFAACTLGGIPLSGIIFSYTQIATSI
LKMPSSGRKYKAFSACGSHLSVVSFYGTGLGVYISSAVSDSSRTAVASVMYTVVTP
VL" (SEQ ID NO:275).
10          BASE COUNT    82 a   140 c   108 g   157 t
ORIGIN
15          1 tgtggccatc tgtcacccctc tgacatacac agacatcatg actcctcgtc tgtgtggct
61 gctgggttca ctcccctgt ccatttgc tc cgccggatgcc ctgcctcaca gcctcatgtc
121 gctgcagctg tcctctgc a cagacccctt ttctctgtg aagtgcgtca
181 ggctgtcaag ctgcgtgtc ccgataccct cgtcaacaac ctctgtatctt atttgcac
241 ttgcacccctg ggtggcattc ctctgtctgg catcattttt tcttacactc aaatagccac
301 ctccatttg aaaatgcgtt catcgccag aaagtataaa gcctttccg cctgtggc
361 tcacctgtca gtgtttccctt gttctatgg gacaggttt ggggtgtaca tcagttctgc
421 agtttctgac tcttcaagga ggactgcgtt ggcttcgtatg atgtacactg tggtcactcc
481 cgtgtt (SEQ ID NO:276).
20
25          OR171
LOCUS AF179792 486 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY172) gene, partial cds.
ACCESSION AF179792
KEYWORDS
30 SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
35 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
40 REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..486
        /organism="Macaca sylvanus"
        /db_xref="taxon:9546"
gene   <1..>486
        /gene="MSY172"
CDS     <1..>486
        /gene="MSY172"
        /codon_start=1
        /product="olfactory receptor"
50

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EST 2412610

/translation="PAICQPLRYVLMNHRLCVLLVGAAWVLCLLKSVTETVIAMRLP
FCGHVVSHFTCEILAVLKLCNTSVSEVFLLVGSILLPVPLAFICLSYLLILATI
LRVPSAAGCRKAFSTCSAHLAVVLLFYSTIIFTYMKPKSKEAHISDEVFTVLYAMVTP
ML" (SEQ ID NO:277).

5 BASE COUNT 79 a 163 c 125 g 119 t

ORIGIN

1 cctgcccata cccaggccact caggtaccgc gtgctcatga accacccggct ctgttgctg
61 ctggtgggag ctgcctgggt ccttcgcctc ctcaagtcgg tgactgagac agtcattgcc
121 atgaggctgc cttctgtgg ccaccacgtg gtcagtcact tcacctgcga gatcctggcg
181 gtgctgaagc tgacgtgcgg taacacatcg gtcagcgggg tcttcgtct ggtgggctcc
241 atcctgctgc tgccctgtgcc cctggcattc atttgccatgt cttacttgc catcctggcc
301 accatcctga ggggcctc agtgcgtgg tgccgcaaag ccttcacac ctgtcagca
361 cacctggctg tgggtctgtt tacatcgtc accatcatc tcacgtacat gaagcccaag
421 agcaaggaaag cccacatctc tgatgaggtc ttacagtcc ttcacgcctt ggtcacaccc
481 atgttg (SEQ ID NO:278).

OR172

20 LOCUS AF179793 489 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY173 pseudogene, partial sequence.
ACCESSION AF179793
KEYWORDS
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 489)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
30 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 489)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
35 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..489
40 /organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>489
/gene="MSY173"
/pseudo
45 BASE COUNT 95 a 120 c 104 g 170 t
ORIGIN
1 cgtggccatc tgtaacccac tgggtacac ggtcaccatg tctccccaga tgggtttgt
61 cttttgtcg ggtgtctatg ggatgggggt ttttggggct gtgactcata tggaaacat
121 aacgtttatg tcccttgatc gagacaacct tgcataatc tacatgtgt accttc
181 tctccctgag ctctcttgca acagcactta cataaaatttgc ctgggtgggtt ttattattgt
241 gaccaatggc attgggggtgc caattgtcac catttttac tcttatgggtt ttatttttc
301 cagcatttc cacatttagct ccacagaggg caggctaaa gccttcagta cctgcagtc
361 cacataatttgc tggtatcgct gtctttggg tcaggtgcctt tcatgtaccc cacaccac
421 tcttagtctac ccctggacca ggggaacgtg tcctccattt ttataactgc tgtaatgccc

481 attagattt (SEQ ID NO:279).

OR173

5 LOCUS AF179794 481 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY174) gene, partial cds.
ACCESSION AF179794
KEYWORDS
SOURCE Barbary ape.
10 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 481)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 481)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..481
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>481
/gene="MSY174"
30 CDS <1..>481
/gene="MSY174"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYATIMSQPMCGFLMGVAGILGFVHGGIQLTFIAHLP
35 FCGPNVIDHFMCMDLVPILLEACTDTHTLGPLIAANGSLCFLIFSMVLASYVIILCSL
RTHISERGRHKVLSSCTSHIFVVLFFVPCSYLYLRPLTSFFPTDKAVTVFCTLFTPML" (SEQ ID
NO:280).
BASE COUNT 92 a 126 c 97 g 166 t
ORIGIN
40 1 tgtggccatc tgtaagccct tgcaactatgc aaccatcatg agtcaaccta tgtgtggatt
61 cctgatgggg gtggctggga ttctggatt tgtcatggaa gggatccaga ctttgtcat
121 agccccatctt ccattctgtg gccctaattgt catcgaccac ttatgttg atttagtacc
181 tcttcttagag ctggcctgc a c a g a c a c t c a c a c t t g g g g c t c t g t g a t g c t g c a a c a g
241 tggatcattg tttttccat gctggttgct tcctatgtca tcatcctgtg
45 301 ctccttaagg actcatatct ctgaaaggcgc tcacaaagt ctgtctgtt gtaccttc
361 tatcttttgtt gtcatcttat tctttgtccc ttgttcatac ctgtatctaa gacctcttaac
421 ctccttccttc cccactgaca a a g c t g t g a c t g t t t g c a c c t a t t a c a c c t a t g t t
481 g (SEQ ID NO:281).

50 OR174

LOCUS AF179795 402 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY175 pseudogene, partial sequence.
ACCESSION AF179795

DRAFT 24/02/98

KEYWORDS

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

5 REFERENCE 1 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

10 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

15 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..402
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>402
/gene="MSY175"
/pseudo

20 BASE COUNT 89 a 105 c 77 g 131 t

25 ORIGIN

1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcatgca
61 gcttgtgc ttgggtggc ttgctggtt ctgcgtcacct ttccaccact cctcttaggc
121 ctaaatcttg acttctgtgc ctgcctccaa cgtcattaat catttctact gtgacactac
181 tccactcctg cagatttcct gcactgcac acagctctg gacaggatgg gattcatttc
241 agcattggtg acactcttag tcacattggt aatggtgatg gtatcatgat atcccttct
30 301 tatggcgatg gcatcttcat gtatgttaag ccacgtgtca aacaaaagat atattttca
361 aagggaattt tggtgctcaa cacctctgtc gttccacttt tg (SEQ ID NO:282).

OR175

35 LOCUS AF179796 487 bp DNA PRI 31-DEC-2000

DEFINITION *Macaca sylvanus* olfactory receptor (MSY176) gene, partial cds.

ACCESSION AF179796

KEYWORDS

40 SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

45 REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

50 REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

DRAFT

	FEATURES	Location/Qualifiers
	source	1..487
		/organism="Macaca sylvanus"
		/db_xref="taxon:9546"
5	gene	<1..>487
		/gene="MSY176"
	CDS	<1..>487
		/gene="MSY176"
10		/codon_start=2
		/product="olfactory receptor"
		/translation="VAICNPLLYALVVSPKVCRLLVSLTYLQLSLITALTVSSCVFSVS
		YCSSNIINHFYCDDVPLLALSCSDTYIPETAVFIFSGTNLFFSMTVVLISYFNIVITI
		LRIRSSEGRQKAFSTCASHMIAAVVVFYGTLLFMYLQPRSNHSLTDKMASVFYTLIIP
		ML" (SEQ ID NO:283).
15	BASE COUNT	104 a 123 c 87 g 173 t
	ORIGIN	
		1 cgtaggctatt tgcaaccctc tgcgtctacgc attagtgggt tctccaaagg tatgtcgct
		61 gctgggtgtcc ctacatacc ttccagactt tatccacagcc cttaactgtct cttccctgtgt
20		121 gtgtctgtgt tcataactgtt ctccaaacat catcaaccat tttactgtgt acgtgtccc
		181 ttggcttagca ttgtcggttt ctgatacccta cattccagaa acaggcgtgtt ttatcttttc
		241 agggaccaaattt ccatacgccgt ttgtctgtata tcctacttca acatggat
		301 taccatgttgg aggatacggtt cctcagaagg acgacaaaaaa gcctttcca cgtgtgttc
		361 tcacatgata gctgtgggttg tggctatgg gactctccctt ttcatgtatt tgcaaccaag
25		421 gagtaatcac tcattagata ctgacaaaat ggccctggtc ttctacaccc tgatcatacc
		481 tagtttg (SEQ ID NO:284).

OR176

30	LOCUS	AF179797	487 bp	DNA	PRI	31-DEC-2000	
	DEFINITION	Macaca sylvanus olfactory receptor (MSY177) gene, partial cds.					
	ACCESSION	AF179797					
	KEYWORDS						
	SOURCE	Barbary ape.					
35	ORGANISM	Macaca sylvanus					
		Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;					
		Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;					
		Macaca.					
	REFERENCE	1 (bases 1 to 487)					
40	AUTHORS	Giorgi,D.G. and Rouquier,S.P.					
	TITLE	The olfactory receptor gene repertoire in primates and mouse:					
		Evidence for reduction of function in primates					
	JOURNAL	Unpublished					
	REFERENCE	2 (bases 1 to 487)					
45	AUTHORS	Giorgi,D.G. and Rouquier,S.P.					
	TITLE	Direct Submission					
	JOURNAL	Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR					
		1142, rue de la Cardonille, Montpellier Cedex 5 34396, France					
	FEATURES	Location/Qualifiers					
50	source	1..487					
		/organism="Macaca sylvanus"					
		/db_xref="taxon:9546"					
	gene	<1..>487					
		/gene="MSY177"					
	CDS	<1..>487					

DRAFT 2/2/68

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/gene="MSY177"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYAIIMGQSQCVTLVAGSWVIACACALLHTLLAWLS
FCADHIIIPHFFCDLGALLKLSCSDTSNQLAIFTAGLTAIMLPFLCILVSYGHTAVTI
LQIPSTNGICKALSTCGSHLSAVTLYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:285).
5 BASE COUNT 94 a 146 c 91 g 156 t
ORIGIN
10 1 tgtggccatc tgtcacccctc tacattatgc catcatcatg ggtcagagtc agtgtgtcac
61 gctgggtggct gggctctggg tcatcgcttg tgctgtgtct ctttgcaca ctctccct
121 ggcctggctt cccttctgtg ctgatcacat catccctac ttcttctgtg accttgggtgc
181 cctgctcaag ttgcctgtc cagacaccc tcctcaatcag tttagcaatct ttacagcagg
241 attgacagcc attatgccttc cattcctgtg tatcctgggtt tcttatggtc acactgcagt
15 301 caceatccctc cagatcccctt ctaataatgg catatgcaaa gcctgtcca ctgtggatc
361 ccacatctca gcagtgaactc tcttattatgg gaccattattt ggtctctattt ttctcccccc
421 atccagcaac actaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:286).
20 OR177
LOCUS AF179798 487 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY178) gene, partial cds.
ACCESSION AF179798
25 KEYWORDS
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
30 REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
35 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
40 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
45 gene <1..>487
/gene="MSY178"
CDS <1..>487
/gene="MSY178"
/codon_start=2
50 /product="olfactory receptor"
/translation="VAICFPLHYAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTQVNELAIFITGGLILVIPFLLILGSYARIVSSI
LKVPSSKGICKAFSTCGSHLSVSLFYGTIVIGLYFCPSANSSTLKETVMAMMYTVVTP
ML" (SEQ ID NO:287).

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DRAFT 24/260

BASE COUNT 83 a 144 c 105 g 155 t
 ORIGIN

1 tgtggccatc tgctcccccc tgcaaacac cgccatcatg agccccatgc tctgtctcg
 61 cctggggcg ctgtctggg tactgaccac ctccatgcc atgttacaca ctttactcat
 121 ggccagggttg tgttttgtg cagacaatgt gatccccac ttttctgtg atatgtctc
 181 tctgctgaag ctggcctgct ctgacactca agttaatgaa ttggcgatat ttatcacgg
 241 agggtctattt ctgtcatcc cattectact catccctggg tcctatgcac ggattgtctc
 301 ctccatccctc aagggtccctt cgctaaaggg tatctgcaag gccttccta ctgtggctc
 361 ccacccctct gtgggtgtcac tggctatgg gaccgttatt ggtctctact tctgccccatc
 421 agctaatagt tctactctaa aggagactgt catggctatg atgtacactg tggtgacc
 481 catgtg (SEQ ID NO:288).

OR178

15 LOCUS AF179799 484 bp DNA PRI 31-DEC-2000
 DEFINITION Macaca sylvanus olfactory receptor (MSY179) gene, partial cds.
 ACCESSION AF179799
 KEYWORDS
 SOURCE Barbary ape.
 20 ORGANISM Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 484)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 484)
 30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 35 source 1..484
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>484
 /gene="MSY179"
 40 CDS <1..>484
 /gene="MSY179"
 /codon_start=2
 /product="olfactory receptor"
 /translation="CAICCPLHYTTAMSPKLCILLSLCWVLSVLYGLIHTFLMTTVT
 FCGSRKIHYIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAI
 LRIPSVKKYKAFSTCASHLGVVSLFYGTLCMVYLKPLHTYSVKDSVATVMYAVVTPM
 M" (SEQ ID NO:289).
 BASE COUNT 102 a 139 c 93 g 150 t
 ORIGIN
 50 1 atgtggccatc tgctcccccc tccactaacac cacagccatg agccctaagg tctgttatctt
 61 actcccttcc ttgtgtggg tcttatctgt gctctatggc ctcatacaca ctttccat
 121 gaccacgggttg accttctgtg ggtcacgaaa aatccactac atcttctgtg agatgtatgt
 181 attgctgagg ctggcatgtt ccgacactca gattaatcac acagtgtca ttggcacagg
 241 ctgtttatc ttcttcattc ctttggatt catgtacatt tctatgtgt tgattgtcag

301 agccatcctc agaataccct cagtctctaa gaaataaaaa gccttcctcca ctgtgcctc
361 ccattgggt gtatgtccc tcttctatgg gacacttgtt atggatacc tgaagccccct
421 ccatacctac tctgtgaagg actcagtagc cacagtatgatg tatgcgggtgg tgacacccat
481 gatg (SEQ ID NO:290).

5

OR179

LOCUS AF179800 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY180 pseudogene, partial sequence.

10 ACCESSION AF179800

KEYWORDS

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

15 REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

20 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

25 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

30 gene <1..>487

/gene="MSY180"

/pseudo

BASE COUNT 92 a 143 c 100 g 152 t

35 ORIGIN

1 tgctgccata tgtcacccctc tccattacac tgccatcatg aggaaagagc tctgtgtctt

61 cttagtggt gtatcttcaa ttctgtcttg tgccagctcc ctctctcaca cccttcctc

121 gacccagctg tctttctgtg ctgcgaacac catccccac atcttctgtg accttgctgc

181 cctgctcaag ctgtcctgtt cagatatctt cctcaatggat ctggatcatgt tcacatgg

241 ggtgggtggc attaccctgc cattcatgtg tattctggta tcataatggct acactggggc

301 caccatccctg agggtccctt caaccaaagg gatccacaaa gcatatgtcca catgtgcctc

361 ccatactcttctt gtgtttctc tcttattatgg gtcaatattt ggccagtaac atttccaaac

421 tgaagcgt tctattgaca aggatgttac tggatcttc atgtacatcg tggatcacacc

481 cggtgtt (SEQ ID NO:291).

45

OR180

LOCUS AF179801 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY181 pseudogene, partial sequence.

50 ACCESSION AF179801

KEYWORDS

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

source 1..487
15 /organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
/gene="MSY181"
/pseudo

20 BASE COUNT 92 a 144 c 100 g 151 t
ORIGIN

1 tgctgccata tgtcaccctc tccattacac tgccatcatg aggaaagagc tctgtgtctt
61 cttagtggct gtatcttcaa ttctgtctg tgccagctcc ctcttcacca cccttctct
121 gaccaggctg tcttctgtg ctgcgaacac catccccac atcttctgtg accttgcgtc
181 cctgctcaag ctgtccttgtt cagatatctc cctcaatgag ctggtcatgt tcacagttag
241 gggtgggtgc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatctcg agggccctt caaccaaagg gatccacaaa gcattgtcca catgtgcctc
361 ccatctctct gtgtttctc tctattatgg gtcataatattt ggcaggtaac attcccaac
421 tgtaageagt tctattgaca aggtatgtac tgtggctctc atgtacatcg tggcacacc
481 cggttg (SEQ ID NO:292).

OR181

LOCUS AF179802 487 bp DNA PRI 31-DEC-2000
35 DEFINITION Macaca sylvanus olfactory receptor (MSY182) gene, partial cds.
ACCESSION AF179802
KEYWORDS
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers

source 1..487

DRAFT GENOME

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/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>487
5 CDS <1..>487
/gene="MSY182"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYMIVIMNNRVCTLLVLCSWVAGLMIVPPLSLGLQLE
FCGSNAIDHFSCDAGPLLKISCSDTWVIEQIVILMAVFALIITLVCVILSYLYIVRTI
LRFPSVQQRKKAFSTCSSHMIVVSIAYGSCIFVYIKPSAKDEVAINKGVSVLTTSVAP
LL" (SEQ ID NO:293).
BASE COUNT 115 a 113 c 98 g 161 t
ORIGIN
15 1 tgtggccatc tgtaaaacccc ttcaattatg ggtcatcatg aacaacaggg tgtgtaccctt
61 attagtccctc tgcagttggg tggctggctt gatgatcatt gtccaccac tgagcttagg
121 ctcaggcgc gaattctgtg gctccaatgc cattgtatcat tttagctgtg atgcaggcc
181 tctcctaaag atctcatgtc cagacacatg gtaatagaa cagatagtt tacatgtgcc
241 tgtatttgc ctcaattatca ccctagttt tgtagttcg tcctactgt acatgtcag
301 aacaattctg aggttccctt ctgttcagca aaggaaaaag gcctttcta cctgttcatc
361 ccacatgatt gtggttcca ttgcctatgg aagtcgcatt tcgtctata tcaagccctc
421 tgc当地 aagat ggaggccca taaataaagg agtttcgat ttactactt ctgtgcacc
481 ctgtttg (SEQ ID NO:294).

25 OR182

LOCUS AF179803 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA169) gene, partial cds.
ACCESSION AF179803
30 KEYWORDS
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
35 REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
40 REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
50 CDS <1..>487
/gene="CJA169"
/codon_start=2
/product="olfactory receptor"

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/translation="VAICRPLYYSTVMSPQVCALILALCWVLTNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVFLGGTVLIVPFICIVTSYIHIVPAI
LRVRTCGGAGKAFSTCSSHLCIVCIFYGTLFSAYLCPPSIASEEKDIAAAALYTIVTP
ML" (SEQ ID NO:295).

5 BASE COUNT 89 a 147 c 103 g 148 t
ORIGIN

1 tgtggccatt tgccgcccc tttactactc cacagtcatg agcccccaag tctgtgccct
61 aatcccttgc ttgtctggg tcctcaccaa ttgttgtgcc ctgactcaca cactccat
121 ggctcgactg tccttcgtg tgactgggg aatagctac ttgttgttg acatcactcc
181 ttgttgtgaag ctatcatgtt ctgacaccca catcaacgag atgttgttt ttgttgtgg
241 aggacacaga ctatgtcc cttttatatg ctttgtcacc tcctacatcc acatttgtcc
301 ttgtatccgg agggccaa ctgtgggg ggcgggcaag gcctttcca cctgcagg
361 ccacccctgc attgttgta tattctatgg gacccttc agtgcctacc ttgttgtcc
421 ctctattgcc tctgaagaga aggacattgc agcagctgca ctgtatacca tagtgtactcc
481 catgtg (SEQ ID NO:296).

OR183

LOCUS AF179804 486 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA170) gene, partial cds.
ACCESSION AF179804

KEYWORDS

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Callithrix jacchus"

40 /db_xref="taxon:9483"

gene <1..>486

/gene="CJA170"

CDS <1..>486

/gene="CJA170"

45 /codon_start=1

/product="olfactory receptor"

/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS

FCTDLEIPRFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSI
RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNHSRAAASVMYTVVTP

50 ML" (SEQ ID NO:297).

BASE COUNT 96 a 135 c 102 g 153 t

ORIGIN

1 gtggccatct gtcacccact gcaactacaca gtcaccatta accccagact gtgtggactg

61 ctgttgtgg catcctggat cctgagtgcc ctgaattctt cattacaaac cttaatatgt

121 ctgcggcctt cctctgcac agacttggaa atccccgct tttctcgca acttaatcg
181 gtcatccacc ttgcgtgtc tgacacttt cttaatgtat tggtgatgtt ttggccgt
241 gtgcgtgtgg ggggtggtcc cctgcagggtt attcttactt cttactctaa gatagtttcc
301 tccatactgt caatctcatc agctcagggg aagtacaagg cattttccac ctgttatct
361 cacatcttaa ttgtctccctt attttatgtt acactcttag gtgtgtactt tagttctgt
421 gcaactggca actcacattc aagagctgca gcctcggtga tgtactactgt ggtcaccc
481 atgctg (SEQ ID NO:298).

OR184

LOCUS AF179805 487 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA171) gene, partial cds.
 ACCESSION AF179805
 KEYWORDS
 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS,
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>487
 /gene="CJA171"
 CDS <1..>487
 /gene="CJA171"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICNPLLYMVTMSPQVCLLNGVYGMGALGA
 FCAETLVNHYMCDILPYLESCNSSYINLLVFIIVTIGIGVPIV
 LHISSAEGRSKAFSTCSSHIVVVVLFFGSGAFMYLKPPSILPLD
 MF" (SEQ ID NO:299).
 BASE COUNT 88 a 118 c 107 g 174 t
 ORIGIN
 1 cgccatc tgtaacccac tggatgtatc ggtcaccatg tctccccagg tggcgttgc
 61 ctttttgtt ggtgtatcg ggatggggc ttgggggct gtggctatc tggaaacat
 121 aatgtttatc acctttgtt cagaaaacctt tgcaatcac tacatgttg acatccatcc
 181 cctcttgag ctctctgc acagcttta cataaaatttgc tggatgtttt ttatattgtt
 241 gaccatgttgc attggggatc ccattgtcac cattttatc tcttatgggtt ttatcttc
 301 cagcatctc cacattgtt ctgctgaggc caggctaaatc gccttcgtt cttgcgttgc
 361 ccacatgtt gggatgttgc ttcttttttgg gtcaggatgtt ttatgttacc tcaaaccacc
 421 tttatgttcca cccctggacc agggggaaatgttgc tttatgttacc tcaaaccacc
 481 catgttt (SEQ ID NO:300).

OR185

LOCUS AF179806 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA196) gene, partial cds.

5 ACCESSION AF179806

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

20 FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

25 gene <1..>487

/gene="CJA196"

CDS <1..>487

/gene="CJA196"

/codon_start=2

/product="olfactory receptor"

/translation="LAICHPLHYSSKMSLCSTLMLGCLWTTASLHALLHTLLARLD

FCASNVIPYFFCDLVPLLQLSCSDTRLNQLMIVLVGGIILLPFLGILGSYTCIAAV

LRVPSARGTWKAFTCGSHLTMVILFYGTISGVYLRPSSHSTDKDSLAVSVMYMVVT

ML" (SEQ ID NO:301).

35 BASE COUNT 78 a 176 c 105 g 128 t

ORIGIN

1 ctggccatc tgccacccgc tgcactactc ctccaagatg agccctgtca gctgcaccc

61 aatgttgggc tgcttatggc ccactgccag cctccatgcc ctctcgacaca ccctttcttt

121 ggcccggtgt gacttctgtc ccagcaatgt tatcccctac ttcttctgtc acctcggttt

181 cctgctccag ctctcctgtt ctgacaccgg actcaaccgg ctcatgattt tgctgggtgg

241 gggcgtatc atcctcttgtc ctttccttg cattctcggt ttctacacat gcatggcagg

301 tgcagtgttc agagttccct ctgcagggg tacgtggaaag gcctttcca cctgtggctc

361 ccacatggacc atggatcc tcttctatgg caccatctca ggggttacc tgaggccctc

421 atcctccac tccacagaca aggactcaact agccctcgatg atgtacatgg tagtgacc

481 catgtcg (SEQ ID NO:302).

OR186

LOCUS AF179807 487 bp DNA PRI 31-DEC-2000

50 DEFINITION Callithrix jacchus olfactory receptor (CJA197) gene, partial cds.

ACCESSION AF179807

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA197"

CDS <1..>487

/gene="CJA197"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS

FCTDLEIPHFFCELNQVIHLACSDTFLNDVVMYLAAVLLGGGPLAGILYSYSKIVSSI

RAISSAQGKYKAFSTCVSHILVSLFYGTLLGVYLSSAATGNHSRAAASVMYTVVTP

ML" (SEQ ID NO:303).

20 BASE COUNT 98 a 134 c 100 g 155 t

ORIGIN

1 tggccata tgtcacccac tgcaaacac agtcaccatt aaccccagac tggact

61 gctggttctg gcatcctgga tcctgagtgc cctgaattcc tcattacaaa cttatagt

121 gctcggttcc ttccctgc ca gagacttggaa aatccccac ttttctgcg aacttaatca

181 ggtcatccac ctgcctgtt ctgacacttt tcataatgtat gtttgatgt attggccgc

241 tggctgtcg ggggggtgtc cccttcagg gatttttac tcataatctca agatagttc

301 ctccatacgt gcaatctcat cagtcaggaa gaagtacaag gcatttcca cctgtgtate

361 tcacatctta atgtctctt tattttatgg tacactccta ggtgttacc ttgttctgc

421 tgcactggc aactcacatt caagagctgc agcctcggtg atgtacactg tggcaccc

481 catgctg (SEQ ID NO:304).

OR187

40

LOCUS AF179808 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA198) gene, partial cds.

ACCESSION AF179808

45

KEYWORDS SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

50 TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
10 /gene="CJA198"
CDS <1..>487
/gene="CJA198"
/codon_start=2
/product="olfactory receptor"
15 /translation="IAICSPPLYNVIMSYHFCFRLTVGVYILGILGSTIHTSSMLRLF
LCKTNVINHYFCDLFPLLELSCSSTYINELLVLVLSALNILTALASYIFTIASI
LHIRSTEGRSKAFSTCSSHISAVAVFFGSAAFMYLQPSSVSSMDQGVSSVFYTTVVP
ML" (SEQ ID NO:305).

20 BASE COUNT 101 a 138 c 87 g 161 t

ORIGIN
1 cattgccatc tgtagccccct tcgtgtacaa tgcatacatg tcctatcaact ctgcgttccg
61 gctcacagtggatc tttagggcat cttggatct acaattcaca ccagcttat
121 gttagactc ttcttgca aaactaatgt gattaaccat tatttttgtt atctcttccc
181 tctcttggaa ctctccgtct ccagttaccta catcaatgaa ttactatgtt ggctttag
241 tgattgtaat atccgtacgc ctgccttaac tttcttggcc ttatatatct tcaccattgc
301 cagttatcc tcacattcgtt ccactggagg caggtccaaa gccttcagca ctgtcgatc
361 ccacatctca gctgttgctg ttctttgg atctgcagca ttcatgttacc tgccatc
421 atctgtcgat tccatggacc aggggaaagt gtcatctgtt ttacacaa ctgttgcc
481 catgctg (SEQ ID NO:306).

OR188

LOCUS AF179809 469 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA199) gene, partial cds.

35 ACCESSION AF179809

KEYWORDS

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
40 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 469)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 469)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..469

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>469
 /gene="CJA199"
 CDS <1..>469
 /gene="CJA199"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTTVMSRGLCCVLVAASWMGGFVHSTVQTLTIRLP
 FCGPNQVDNFFCDVPPVIKLACADTFVIELLMVSNSGLISTSSFVVLISSYTTILVKI
 HSKEGRRKALSTCASHLMVVTLFGPCSFYPHPFSTFSVDKMVSVLYKVITPML" (SEQ ID
 5 NO:307).
 BASE COUNT 91 a 126 c 97 g 155 t
 ORIGIN
 1 tggctatc tgcacccccc tgcaaacac cactgtcatg agtcggggat tatgttgt
 61 gttgggtgttgc gctccctggaa tggaggatt tggactcc accgtccaga ccatttcac
 121 tattccgtctg cccttttgtg ggccaaatca ggtggacaac ttttttgtg atgtcccc
 181 tgcataaaa ctggcctgtg ctgacacttt tgcattgaa ttgctcatgg tatctaacag
 241 tgggttgc tccaccagct ccttttgtggt gctgattcc tctcaccca ctatcctag
 301 caagattcac tc当地aggagg gaaggcgaaa ggcactctcc acatgtgcct ctcacccat
 361 ggtggtaaca ct当地ggac ctgttagttt catctatctt catccttctt ctacatttc
 421 tggacaag atgggtctg tactctaa ggttattact ccaatgcta (SEQ ID NO:308).

OR189

LOCUS AF179810 488 bp DNA PRI 31-DEC-2000
 25 DEFINITION Callithrix jacchus olfactory receptor (CJA201) gene, partial cds.
 ACCESSION AF179810
 KEYWORDS
 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 30 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 488)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 35 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 488)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 40 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..488
 /organism="Callithrix jacchus"
 45 /db_xref="taxon:9483"
 gene <1..>488
 /gene="CJA201"
 CDS <1..>488
 /gene="CJA201"
 50 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICFPLRYMLLMSHSICVTMIIVCWSISIAGALITVFTMHL
 YCGPYKINHFFCEVPAVLKLACADTSFNDRLDFILGFILLVPLSLILASYVFIFASI
 FRIRSAQGRLKSFSTCASHVTVMFYGPAPIIMYMRPGSWYDPERDKKLALFYNVVSG"

FL" (SEQ ID NO:309).

BASE COUNT 84 a 145 c 105 g 154 t
ORIGIN

5 1 cgttgcatt tgctcccc ttgcgtatg gctactcatg agccattcca ttgtgtcac
61 gatgattata gtttgtgg ccattagcat agctggggcc ctgatcctca ctgtctcac
121 catgcacatcg ctttattgtg gccctacaa gataaaccac ttcttcgtg aggtccctgc
181 tgcctgaag ttggcctgtg cagacacatc tttaatgac aggctggact tcacatctgg
241 ttcatccctg ctgggtcc cactctccct cactcttgcc tcctacgtct tcacatcttg
301 ctctatcttc agaatccgt cagcgcaggg gaggctcaag tccttcctca cgtgtgctt
361 ccacgtcaact gtggtcacca tggctatgg gcccgcacatc atcatgtaca tgaggccgg
421 ttctggat gaccagac gggacaagaa gtagcgcgt tcataatg ttgtctctgg
481 ctccctca (SEQ ID NO:310).

OR190

15 LOCUS AF179811 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA202) gene, partial cds.
ACCESSION AF179811
KEYWORDS
20 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 487)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
35 source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA202"
40 CDS <1..>487
/gene="CJA202"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLRYTATMNLRLCVQLVAGLWLVTYLHALLHTSLIAHLS
45 FCAFNIHHFFCDLNPLLSCAVSFNVMIIAVGGLALTPLVCILVFYGLIFSTV
LKITSTQGKQRAASTCGCHLSVVVLFYGTIAAVYFSPSSHTPESDTLSTVMYSVVAP
ML" (SEQ ID NO:311).
BASE COUNT 86 a 152 c 94 g 155 t
ORIGIN
50 1 tgtggcaatt tgccacccct tacgttacac tgccacaatg aacctgcgcc ttgtgtcca
61 gctagtggct ggactgtggc ttgttactta cctccatgcc ctccatgcata ctccctaat
121 accacatcg tccttcgtg cttcaatat catccatcat ttcttcgtg atctcaaccc
181 tctactacgg ctcttcgtct ctgcgtcctc ctcaacgtatgatcattt ttgcgttgg
241 aggtctatgg gctctcacgc cccttgcgtc tatcctcgta ttttatggac ttatctc

301 cactgttctg aagatcacct ctactcaggg gaaacagaga gctgcgttcca cctgcggctg
361 ccacctgtca gtatgtttgc tgtttatgg cacaggcatt gccgtctact ttagccccctc
421 atcccccatt acgcctgaga gtgacactct ctcgaccgtc atgtattcag tggtgccccc
481 gatgtg (SEQ ID NO:312).

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OR191

LOCUS AF179812 491 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY110 pseudogene, partial sequence.
ACCESSION AF179812
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 491)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 491)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..491
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>491
/gene="PPY110"
/pseudo
BASE COUNT 92 a 118 c 105 g 176 t
ORIGIN
1 cgtggccatc tgtaacccac tggtaaac ggtcaccatg tctcccaaga tggtttgc
61 cttttcactg ggtgtctatg ggatgggggt ttttggggct gtgggtcata tggaaacat
121 aatgtttatg tcctttgtg gagacaacct tgtaatcac tatctgtgtg acatcattcc
181 tctccctgag ctccctgca acagctcta cataaaatttgc ttatattgtt
241 gaccattggc attgggggtc caattgtcac cattttatc tcttattgggtt ttatcttcc
301 cagcattctc cacattagct cacagagggc aggtcagggtc taaagccttc agtacctca
361 gttcccatat aatttgttgc tcgcattttctt tgggtcagg tgctttcatg tacctaaac
421 caccttcctt tctaccctgt gaccaggga aagtgtcctc cattttat actgctgtgg
481 tgccatgtt t (SEQ ID NO:313).

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REFERENCE 1 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
5 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..480
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
15 gene <1..>480
/gene="PPY111"
/pseudo
BASE COUNT 81 a 141 c 100 g 158 t
ORIGIN
20 1 tgtggccatc tgctcccccc tgcactacac catccatcat gagccccatg ctctgtctct
61 ccctttggc gtgttctgg gtgtgacca cttccatgc catgttacac actttactca
121 tggccaggtt gtgttttgt gcagacaatg tgatcccca cttttctgt gatatgtctg
181 ctctgctgaa gctgtcctgc tctgacactc gagttaatga atggfgata ttatcatgg
241 gaggggctcat tctgtcatac ccattcctac tcatcctgg gtcctatgca cgaattgtct
301 cctccatct caagggtccct tctaagggtt tctgcaaggc cttctact tttggctccc
361 acctctctgt gggttccctg ttctatggta ccgttagtgg ttctactta tgcccatcg
421 ctaatagttc tactctgaag gagactgtca tggctgtaa gtacactgtg gtgaccggca (SEQ ID NO:314).

OR193

LOCUS AF179814 486 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY112) gene, partial cds.

ACCESSION AF179814

KEYWORDS

SOURCE orangutan.

ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>486
/gene="PPY112"

DRAFT GENOME

CDS <1..>486
/gene="PPY112"
/codon_start=1
/product="olfactory receptor"
/translation="CAICHPLHYATIMSQSQCVMVAGSWVIACACALLHTLLARLS
FCADHIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKIIASVIYTVVTP
ML" (SEQ ID NO:315).
5
BASE COUNT 96 a 147 c 93 g 150 t
10 ORIGIN
1 tgccatct gtcaccctct acattatgcc accatcatga gtcagagcca gtgtgtcatg
61 ctggtggtc ggcctgggtt catcgctgt gcgtgtgctc tttgcatac ctccttcgt
121 gcccggctt ccttcgtgc tgaccacatc atctctact tcttcgtga ctttgtgcc
181 ctgctcaagg tgcctgtc agacacctcc ctaatcagt tagcaatctt tacaggcaga
15 241 ttgacagcca ttatgttcc attctgtgc atccctggttt ctatggtca cattgggtc
301 accatccctcc agatccctc caccaaggc atatgcaaag ccttgcacat tttggatcc
361 cacctcttag tggtactat ctattatggg acaattatg gtcctatattt tctacccca
421 tccagcaaca ccaatgacaa gaacataatt gtcgtga tatacacatg agtcaactccc
481 atgttg (SEQ ID NO:316).

20

OR194

LOCUS AF179815 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY113 pseudogene, partial sequence.
25 ACCESSION AF179815
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
30 REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
35 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
40 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
45 gene <1..>487
/gene="PPY113"
/pseudo
BASE COUNT 107 a 130 c 95 g 155 t
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61 tatgactgcc ttctcctgga tcctgggtc tacggatgga atcattgtatc ctgcagcgac
121 attttcccttc tcctactgtg ggctcggga aatagccacat tcttcgttg agttcccttc
181 catactaact ctctcatgca atgacacatc aatatttgaa aagggtctt tcatctgctg
241 tatagtaatg attgttttc ctgttgcattt catcatcgat tcctatgctc aaggttattct

301 ggctgtcatt cacatggat ctggagaggg tcgtcgata gcttcacga cctgtcc
361 tcacctatg gtggggaa tttactatgg agcagcttg ttcatgtaca tacggccac
421 atctgatgc tccccatcac aggacaagat ggtgtctgtt ttctaccca tcctactcc
481 catgtg (SEQ ID NO:317).

5

OR195

LOCUS AF179816 484 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY114) gene, partial cds.

10 ACCESSION AF179816

KEYWORDS

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
15 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

20 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
25 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

30 gene <1..>484

/gene="PPY114"

CDS <1..>484

/gene="PPY114"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLSLVALSWVLTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLSCSDTRVNELVIFIMGLLVIPFLLILGSYARIVSSI
LKVPKGICKAFSTCGSHLSVSLFYGTVSGLYLCPSANSSTLKETVMAVMYTVVTPM
L" (SEQ ID NO:318).

40 BASE COUNT 80 a 142 c 105 g 157 t

ORIGIN

1 tgtggccatc tgctcccccc tgcactacac cgccatcatg agccccatgc tctgtctc

61 cctgggtggcg ctgtctggg tgctgaccac cttccatgcc atgttacaca cttaactcat

121 gcccagggtg tgttttgtg cagacaatgt gatccccac ttttctgtg atatgtctc

181 tctgctgaag ctgtctgtc ctgacactcg agtaatgaa ttggtgatat ttatcatgg

241 agggcattt ctgtcatcc cattcctact catccttggg tctatgcac gaattgtctc

301 ctccatcctc aaggccctt ctaagggtat ctgcaaggcc ttctctactt gtggctccca

361 cctctctgtg gtgtccctgt tctatggac cgttagtgtt ctctactt gcccacggc

421 taatagtct actctgaagg agactgtcat ggctgtatg tacactgtgg tgacccccat

50 481 gctg (SEQ ID NO:319).

OR196

LOCUS AF179817 483 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY115) gene, partial cds.
5 ACCESSION AF179817
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
25 gene <1..>483
/gene="PPY115"
CDS <1..>483
/gene="PPY115"
/codon_start=1
/product="olfactory receptor"
/translation="VAVCHPLHYTLIMHGLCLGLVAGCLVAGFMNSLMETIITFQLL
30 LCHNVINHFACETLAVLRLACVDVSFNKAMVAISGFLVILLPCSLILFSYAHIVAAIL
HIPSAQGRRKAFTCTSHLTVVCMCFGATMFTYMRPAGGSSLEKKNMVALFYAIVIPM
L" (SEQ ID NO:320).
35 BASE COUNT 86 a 136 c 115 g 146 t
ORIGIN
1 gtggccgtct gccaccact gcattacacg ctcatcatgc atggaggcgt gtgcctgggg
61 ctgggtggccg gctgccttgtt ggctggtttc atgaattccc tgatggaaac aattatcacc
121 ttccagcttc tcctgtgtca caatgtttt aatcactttg cctgtgagac cttagcagtg
40 181 ctacgacttag cctgtgtgga cgtctccctt aacaaggcca tggtgccat ctcagggtt
241 ctggtgatcc tgcttccctg ttcaactgatc ctatctccct atgctcacat agttgtgcc
301 attcttcata ttcccttcgc ccagggacgc cgcaaagcct ttgggacttg cacgtctcac
361 ctcaactgtgg ttgcatgtg ctggggcgt acaaagtgtca cctacatgag acctgcgggc
421 ggctccccc tgaaaagaa gaatatggtt gcctctttt atgcattgt gattccaatg
481 ctt (SEQ ID NO:321).

OR197

LOCUS AF179818 484 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY116) gene, partial cds.
50 ACCESSION AF179818
KEYWORDS
SOURCE orangutan.
ORGANISM Pongo pygmaeus

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Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

15 /organism="Pongo pygmaeus"
/db_xref="taxon:9600"

gene <1..>484

19 /gene="PPY116"

CDS <1..>484

23 /gene="PPY116"
/codon_start=2
/product="olfactory receptor"
/translation="VA
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" (SEQ ID NO:322).

25 BASE COUNT 85 a 138 c 116 g 145 t

ORIGIN

30 1 tgtggccgtc tgccacccac tgccattacac gctcatcatg catggaggcc tgtgcctgg
61 gctgggtggcc ggctgcctgg tggctggtt catgaattcc ctgtatggaaa caatttatcac
121 ctccagttt cccctgtgtc acaatgttat taatcacttt gcctgtgaga ccttagcagt
181 gtcacgacta gcctgtgtgg acgttcctt caacaaggcc acggtgccca ttcagggtt
241 tctggtgatc ctgttccctt gttaactgat cttatctcc tatgtcaca tagttgctgc
301 catttttgtt attccttcgtt cccagggaca cccggaaagcc ttggggacct gcacgttc
361 cctcaactgtg gtttgcatgt gccttggggc tacaatgttc acctacatgaa gacctgcggg
421 tggtccctcc ctggaaaagg agaatatgtt tgccctttt tatgccattt tgattccat
481 gctt (SEQ ID NO:323).

OR198

40 LOCUS AF179819 479 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY117 pseudogene, partial sequence.

ACCESSION AF179819

KEYWORDS .

45 SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 479)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 479)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..479
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>479
10 /gene="PPY117"
/pseudo

BASE COUNT 100 a 115 c 91 g 173 t

ORIGIN

15 1 ttagccata tgcaaaccct tatactatgt ggtcatcatg agccgaagga cacgcactgt
61 ctggtaatg atcctctggg ctgtggcctt gggtcacaca ttaaggccagt tatcattttac
121 tggtaacctg cctttttgt ggacctaatg tagtagacag cttttttgt gatcttcctc
181 gagtgaccaa acctggctgc ctggactctt acctcattga aatactaatt gtggtcaata
241 gtggagttct ttccctaagc actttctgtc tcttggtagt cccttacatc attattcttg
301 ttatggtttgc tggctgcaa tggcgaaggc attttctacg ctggcttccc
361 atattgcagt agtaatatta ttcttggac ctggcatctt catctatgt tgcccttta
421 ccatctatcc ttggataaa ctcttgcca tattttacac tgttttcacc cccatccta (SEQ ID NO:324).

OR199

25 LOCUS AF179820 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY118) gene, partial cds.

ACCESSION AF179820

KEYWORDS

SOURCE orangutan.

30 ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

45 source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>487
/gene="PPY118"
CDS <1..>487
/gene="PPY118"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACCALLHTLLARLS
FCADHIISHFFCDLGALLKLSCSDTSNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI

LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:325).

BASE COUNT 95 a 147 c 94 g 151 t
ORIGIN

5 1 tgfgccatc tgccacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctggtagt gggcctggg tcatacgcttgc tgcgtgtcttgc ctttcata ccctcccttc
121 gccccgggtt tcctctgtg ctgaccacat catctctcac ttctctgtg accttgggtc
181 cctgctcaag ctgtcctgtc cagacacccctc cctcaatcag ttacaatctt acataggcagg
241 attgacagcc attatgccttc cattcctgtg catcctgggtt tcttatggtc acatgggggt
10 301 caccatccctc cagattccctc cacaaggcatatgc cccatgtcca ctgtggatc
361 ccacatctca gtggacta ttcttatgg gacaattattt ggtctctattt ttctcccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtactcc
481 catgttg (SEQ ID NO:326).

15 OR200

LOCUS AF179821 475 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY119 pseudogene, partial sequence.

ACCESSION AF179821

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

25 REFERENCE 1 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..475

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>475

/gene="PPY119"

/pseudo

BASE COUNT 98 a 119 c 104 g 154 t

ORIGIN

45 1 gtagccataaa gcaaacctctc ccactatgc atcatcatgaa actcatgcac atgtacaggc
61 ccagtggtag gtcctgggtt cattggggttt atgcactccc tgagccagtt agctttcact
121 gtaagcttc ccttctgtgg cccaaacata gtggacagttt attattgcga cttactttg
181 gtcataaacat gtgcctgtac agatgccttat atccctgaag tggatgtctt tttggacgggt
241 ggctttatgg gggtagccat tttgtttt gctgatctcc tacacggta ttctgattac
301 tggcagcga cattcctcag caggtatggc caaggctcac agcactctga ctggccacat
361 tgctgtggtg accgtgtctt tggggccctg tatcttcatc tatgcctggc ctttcagcaa
421 ctaccatgt gataacattt tgctgttattt ctctgttagt ttcacaccta tatta (SEQ ID NO:327).

DRAFT 2/26/2008

OR201

LOCUS AF179822 487 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY120) gene, partial cds.

5 ACCESSION AF179822

KEYWORDS

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Etheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
25 gene <1..>487
/gene="PPY120"
CDS <1..>487
/gene="PPY120"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATTMSQSQCVMVLVAGSWVIACACALLHTLLARLS
30 FCADHIIPHFFCDLGALLKLSCSDTSNQLAIFTAGLTAIMPLFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIASVIYTVVTP
ML" (SEQ ID NO:328).

35 BASE COUNT 95 a 150 c 94 g 148 t

ORIGIN

1 tgtggccatc tgtcaccctc tacattatgc caccacatg agtcagagcc agtgtgtcat
61 gctgggtggct gggtcctggg tcatcgcttg tgcgtgtgct ctttgcata ccctccttct
121 ggccccggctt tccttcgtg ctgaccacat catccctac ttcttcgtcg accttgggtgc
181 cctgcgtcaag ctgtcctgtc cagacacactc cctcaatcag tttagcaatct ttacagcagg
241 attgacagcc attatgcctc cattcctgtg catcctgggt tcttatggtc acattgggggt
301 caccatccctc cagattccctt ccaccaaggg catacgaaa gccttgtcca ctgtggatc
361 ccacccctca gtggtgacta tctattatgg gacaattattt ggctctattt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:329).

OR202

LOCUS AF179823 487 bp DNA PRI 31-DEC-2000

50 DEFINITION Saimiri sciureus olfactory receptor (SSC184) gene, partial cds.

ACCESSION AF179823

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"

gene <1..>487

/gene="SSC184"

CDS <1..>487

/gene="SSC184"

/codon_start=2

/product="olfactory receptor"

/translation="VAICYPLHYTAIMREGLCAFLVAWSWIPSCASSLSHTLLLTPLP
FCDANTVHFFCDLAALLKLSCSDIFLNELVMFTVGVVITLPPMCILVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVSLYYGSIFGQYLFPPTVSSSIDKDVIVALMYTVVTP
ML". (SEQ ID NO:330).

BASE COUNT 88 a 142 c 106 g 151 t

ORIGIN

1 tggccata tgtaaccctc tccactacac tgccatcatg agggaaaggc tctgtgcctt
61 cttagtggt gtatcttgg a ttccatcttg tgcttagtc ccctctcaca cccttctgt
121 gaccccgctg ctttctgtg atgaaacac cgtccaccac ttcttctgtg accttgcgtc
181 cctgtcaag ctgtcctgtc cagatatctt cctcaatggg ctggcatgt tcacagtagg
241 gggtgggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 cactatctg agggccctt caaccaaagg gatccgcaaa gctgtgtcca tgggtggc
361 ccgtctctt gtgggtctc tgattatgg ctcataatattt ggccagtacc tttcccaac
421 tgaaggcgt tccattgaca aggatgtcat tgggtctca atgtacacag tggcacacc
481 catgctg (SEQ ID NO:331).

OR203

40 LOCUS AF179824 488 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC185) gene, partial cds.

ACCESSION AF179824

KEYWORDS

45 SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

50 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..488
/organism="Saimiri sciureus"
/db_xref="taxon:9521"

10 gene <1..>488
/gene="SSC185"
CDS <1..>488
/gene="SSC185"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICYPLHYTAIMREGLC AFLVA VSWIPSCASSLSHTLLTPLS
FCDANTVHHYFC DLA ALLKLSCSDIFL NELVMFTVGVVVITLPFM CILV SYGYTGATI
LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFP TVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:332).

20 BASE COUNT 89 a 142 c 106 g 151 t

ORIGIN

1 tggccata ttttacccctc tccactacac tgccatcatg agggaaaggc tctgtgcctt
61 cttagtggct gtatcttggaa ttccatcttg tgcttagtc cccttctgtc
121 gaccggctg tcttctgtg atgcaaaac ac gttccaccac tacitctgtg accttgcgtgc
181 cctgctcaag ctgtccgtc cagatatctt cctcaacggg ctggtcatgt tcacagttagg
241 gggtgggtgc attaccctgc cattcatgtg tatcctggta tcatatggc acactggggc
301 cactatccctg agggccctt caaccaaagg gatccgaa gctttgtcca tgtgtggctc
361 ccgtctctct gtgggtctc tgattatgg ctaaatattt gcccaggacc tttcccaac
421 tgaaggcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggcacacc
481 catgttgt (SEQ ID NO:333).

OR204

LOCUS AF179825 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC186) gene, partial cds.

35 ACCESSION AF179825

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
40 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"

gene <1..>487
 /gene="SSC186"
 CDS <1..>487
 /gene="SSC186"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VATCPLRYMVIMNPCLCSLLSPLTSVVNALLSLMVLRLS
 FCTDLEIPLFFCELAQVIQLACSDTLINNILIYFAACIFGGVPLSGIIFSYAQIASSI
 LRMP SARRKYKAFSTCGSHLSMVLFYRTGLGVYISSAVTDSPRKTAVASMMYSVGPQ
 MV" (SEQ ID NO:334).
 BASE COUNT 92 a 126 c 105 g 164 t
 ORIGIN
 1 tgtggccact tgtcaccccc tttagatacat ggtcatcatg aaccctgcc tctgcaggct
 61 gctgattctt cttttcggc tgactagcg tttgtatgcc cttttctca gcctgtatgg
 121 gtggaggctg tccttcgtca cagatctgg aatcccgctc ttcttcgtg aactggctca
 181 ggtcatccag ctgcgttgtt ctgcacaccct catcaataac atccgtatattttgcagc
 241 ttgcataattt ggtgggttcc ctctgttgtt aatcatatcc tcttatgctc agattgcctc
 301 ctctatattt agaatgccc cagcacgcag aaagtataaa gcctttcca cctgtgggtc
 361 tcacctctcc atgggtctct tttttatag gacaggtttgggggttaca tttagtttgtc
 421 attactgac tcaccttagga agactgcagt ggcttcaatg atgtattctg tgggtcctca
 481 aatgggtg (SEQ ID NO:335).

OR205

LOCUS AF179826 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri sciureus olfactory receptor (SSC187) gene, partial cds.
 ACCESSION AF179826
 KEYWORDS
 SOURCE common squirrel monkey.
 ORGANISM Saimiri sciureus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri sciureus"
 /db_xref="taxon:9521"
 gene <1..>487
 /gene="SSC187"
 CDS <1..>487
 /gene="SSC187"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICLPLHYATIMSPMLSRSVALSWVLTTFHAMLHTLLMARLR
 FCADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLIIIGSYARIVFSI

LKVPSKGICKAVSTCGSHLSVVSFYGTIVIGLYLCPSANNSTLKETVMAVMYTVMAP
ML" (SEQ ID NO:336).

BASE COUNT 84 a 140 c 104 g 159 t
ORIGIN

5 1 cgtggccatc tgctcccc tacattacgc caccatcatg agccccatgc tgttcgctc
61 cctggggcg ctgtctggg tgctgaccac ctccatgcc atgtgcaca cttaactcat
121 gcccagggtg cgttttgtg cagacaatgt gatcctcac ttttctgtg atatgtctgc
181 tcgtctgaag ctggccgtct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 aggccattt ctgtcatcc catttactat tattatggg tcttacgcac gaattgtctt
301 ctccatccctc aagggtccctt ctctaaaggg tatctgaag gccgtctcta ctgtggctc
361 ccacccatctt gtgggtcac ttttctatgg gactgttatt ggtctctact tatgcccac
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tggatggcccc
481 catgtcg (SEQ ID NO:337).

15 OR206

LOCUS AF179827 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC190) gene, partial cds.

ACCESSION AF179827

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

25 REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

40 gene <1..>487

/gene="SSC190"

CDS <1..>487

/gene="SSC190"

/codon_start=2

/product="olfactory receptor"

45 /translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLLGLNLD

FCASNVVDFYFDTIPLLQISCTDTQLLERMGFISALVTLLVTLMVIISYTYIALTI

LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP

LL" (SEQ ID NO:338).

50 BASE COUNT 112 a 124 c 91 g 160 t

ORIGIN

1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcgtca

61 gcttgtctt ggggtctggg ttcttgggtt tctcatcatc ttccaccac tcctcttagg

121 actaaatctt gacttctgtg cctccaacgt cgttgcata tttactttt acatcatccc

181 gctcctgcag attcctgca cagacacgcgca gctcctggag aggtggat tcatctcagc

241 gtttgtgaca ctcttagtca cattggtaat ggtgataata tcataactt atattgccct
301 gacaattcta aaaatccctt caactagtca gagggaaaaag gcttttcca cgtgttcttc
361 tcacatgatt gtgatatccc ttcttatgg cagctgcac ttcatgtatg ttaagccatc
421 agtcaaacaa agggatctt ttcaaaggg aatttcggtg ctaataacct ctgtgtc
5 481 acttttg (SEQ ID NO:339).

OR207

LOCUS AF179828 485 bp DNA PRI 31-DEC-2000
10 DEFINITION Saimiri sciureus olfactory receptor (SSC191) gene, partial cds.
ACCESSION AF179828
KEYWORDS
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
25 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Saimiri sciureus"
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gene <1..>485
/gene="SSC191"
CDS <1..>485
/gene="SSC191"
35 /codon_start=1
/product="olfactory receptor"
/translation="VAICHPLQYSVIMTTG YCGQLVAFSYMSGFMISVIKVYFISHVA
FCGSNVNMNHFFCDISPVLK LACKDMSTAELVDFALAVIILVIPLITIILSYIYIVSAI
LHIPSTQGRKKAFSTCASHLT VVIIFYTAMIFTYVRPRAIASFNSNKLMSAVYAVLTP
40 ML" (SEQ ID NO:340).
BASE COUNT 111 a 134 c 80 g 160 t
ORIGIN
1 gtggccattt gccaccctct tcaatactca gtcatcatga ccacaggta ctgtggacag
61 ctggtgccct tctttatc gagtttttc atgatcttg tcataaggt ctatttcatt
45 121 tcacatgtt cttctgtgg ctccaatgtt atgaaccact ttttctgtga tatctcacca
181 gtctaaaac tggcatgcaaa agacatgtcc acagctgagc tagtggactt tgcttttagct
241 atcgcatc ttgtatccc ttcattacc actatctctt cttatatcta catttgtctcc
301 gccattctgc atataccctc cacccaggga aggaagaagg ccttccac ctgtgcac
361 cacctcactg tagtcataat ttttacaca gccatgattt ttacatatgt tcggcccaga
50 421 gctatgtatc cattaattc caacaaacta atgtcagctg tgtatgcagt cctcacaccc
481 atgct (SEQ ID NO:341).

OR208

LOCUS AF179829 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri sciureus olfactory receptor (SSC192) gene, partial cds.
 5 ACCESSION AF179829
 KEYWORDS
 SOURCE common squirrel monkey.
 ORGANISM Saimiri sciureus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 15 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri sciureus"
 /db_xref="taxon:9521"
 25 gene <1..>487
 /gene="SSC192"
 CDS <1..>487
 /gene="SSC192"
 /codon_start=2
 30 /product="olfactory receptor"
 /translation="VAICYPLHYTAIMREGLCAFLVAWSWIPSCASSLSHTLLTPLS
 FCDANTVHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMCILVSYGYTGATI
 LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFQYLFPTVSSSIDKDVIVALMYTVVTP
 ML" (SEQ ID NO:342).
 35 BASE COUNT 88 a 141 c 106 g 152 t
 ORIGIN
 1 tggccata tgaccctc tccactacac tgccatcatg aggaaaggc tctgtgcctt
 61 cttagtggt gtatctggta ttccatcttg tgctagctcc ctcttcaca cccttcgtct
 121 gaccccgctg ttttctgtg atgcaaacac cgtccaccac ttcttcgtg accttgc
 40 181 cctgctcaag ctgtcctgtc cagatatctt cttcaatggat ctggcatgt tcacaggtagg
 241 gggtgggtc attaccctgc cattcatgtg tatcctggta tcataatggat acactggggc
 301 cactatctg agggccctt caaccaaagg gatcccaaa gcgttgtcca tgggtggctc
 361 ccgtctctt gtgggtctc tgtattatgg ctcaatattt gcccagtacc tttcccaac
 421 tgaagcagt tccattgaca aggtgtcat tggctcta atgtacacag tggcacacc
 45 481 catgtcg (SEQ ID NO:343).

OR209

LOCUS AF179830 487 bp DNA PRI 31-DEC-2000
 50 DEFINITION Saimiri sciureus olfactory receptor (SSC193) gene, partial cds.
 ACCESSION AF179830
 KEYWORDS
 SOURCE common squirrel monkey.
 ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"

gene <1..>487

/gene="SSC193"

CDS <1..>487

/gene="SSC193"

/codon_start=2

/product="olfactory receptor"

/translation="VAICYPLHYTAIMREGLCAFLVAWSWIPSCASSLSHTLLTPLS
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCLVSYGYTGATI
LRVPSTKGIRKALSMCGSRLSVSLYYGSIFGQYLFPPTVSSSIDKDVIVALTYTVVTP
ML" (SEQ ID NO:344).

BASE COUNT 88 a 143 c 106 g 150 t

ORIGIN

1 tggccata tgtaaccctc tccactacac tgccatcatg agggaaaggc tctgtgcctt
61 cttagtgct gtatcttggat ttccatcttg tgcttagtcctcc ctcttcaca cccttctgtct
121 gaccccgctg tctttctgtg atgcacaaac cgtccaccac ttcttctgtg accctgtgc
181 cctgctcaag ctgtcctgtc cagatatctt cctcaatggat ctggcatgt tcacagtagg
241 gggtgggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatccctg agggccctt caaccaaagg gatccgcaaa gctgtgcctt tggtggctc
361 ccgtctctt ctgttgtctc tgattatgg ctcaatattt gcccagtacc tttcccaac
421 tgaaggcagt tccattgaca aggatgtcat tggtggctcta acgtacacag tggtcacacc
481 catgctg (SEQ ID NO:345).

OR210

40 LOCUS AF179831 486 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC194) gene, partial cds.

ACCESSION AF179831

KEYWORDS

45 SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

50 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

DRAFT - NOT FOR DISTRIBUTION

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
source 1..486
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>486
10 /gene="SSC194"
CDS <1..>486
/gene="SSC194"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTIIYSYSKIVSSI
RAISSAQGKYKAFSTCASHILIVSLFYGTLLGVYISSAATGNSHSSAAALVMYTVVTP
ML" (SEQ ID NO:346).

20 BASE COUNT 102 a 133 c 97 g 154 t

ORIGIN
1 tgtggccatc tgcaaaaaaa tgcaactacac agtaccatt aacccagac tgtgtggact
61 gctgggtctg gcatcctgga tcctgagtgc cctgaattcc tcattacaaa cttataatgt
121 gctcggttc tccctctgca cagacttgga aatccccac ttttctggt aacttaatca
181 ggtcatacat ctggctgtt atgacactt ccttaatgtat gtgggtatgt attggcagc
241 tatgtgtctg ggccgggtgtc ccctcacagg aattatttac tcttactcta agatagttc
301 ctccatacgt gcaatctcat cagctcaggga gaagtacaag gcgtttcca cctgtgcac
361 tcacatctta attgtctctt tattttatgg tacactccta ggtgtgtaca tttagttctgc
421 tgcactggc aactcacatt caagtgcgtc agcctgggt atgtacactg tggtcacccc
481 catgct (SEQ ID NO:347).

OR211

LOCUS AF179832 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC195) gene, partial cds.

ACCESSION AF179832

KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..487
/organism="Saimiri sciureus"
/db_xref="taxon:9521"

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5   gene <1..>487
      /gene="SSC195"
   CDS  <1..>487
      /gene="SSC195"
      /codon_start=2
      /product="olfactory receptor"
      /translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
      FCSENLVNHYMCVDVLPLELSCNSSYINLLLVIIVAIIGIGVPIVTIFISYGFILSSI
      LHISSTEGRSKAFSTCSSHIIVVSLFFGSGAFMYLKPPSILPLDQGKVSSIFYTAVVP
      MF" (SEQ ID NO:348).

BASE COUNT    92 a   116 c   105 g   174 t
ORIGIN
      1 cgtggccatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tggcttgct
      61 ccttttgtt ggtgtctatg ggatgggggt ttggggggct gtggctcata tggaaacat
      121 aatgtttatg accttttgtt cagaaaatct tgtaatcac tacatgttg atgtccctcc
      181 cctcccttgag ctctccctgc acagctctta cataaaatttg ctgttggttt ttattattgt
      241 ggccattggc attggggtgc caattgtcac catttttac tcttatggttt ttatcttc
      301 cagcattctc cacatttagct ccacagaggc caggctaaa gcctcagta cctgcagctc
      361 ccacataattt gtggatcgc ttcttcttgg gtcaggagct ttatgttacc tcaaaccacc
      421 ttctattctca cccctggacc aggggaaagt gtctccattttatactg cagtggtgcc
      481 catgttt (SEQ ID NO:349).

```

OR212

181 catgttgctt ctgcctgta cgacactg ggttatgaa tacatggttt ttctaagtac
241 aagctgcctt ctccctttc ttcccttgc atcaccgctt cctatggccg agtctattt
301 gctgtctacc atacgcattc aaaaaaggga agaaaaaaagg cctccaccac cattcaacc
361 catttaactg tagtgatctt ttactatgca cctttgtct acacctatct tcggcccagg
421 aatctccact caccatccga agacaagatc ctggcagtct tctacaccat ccttaccct
481 atgctc (SEQ ID NO:350).

OR213

10 LOCUS AF179834 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO214) gene, partial cds.
ACCESSION AF179834
KEYWORDS
SOURCE Bolivian squirrel monkey.
15 ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
20 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
25 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
30 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO214"
CDS <1..>487
35 /gene="SBO214"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLLGLNLD
FCASNVDHFYCDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI
40 LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP
LL" (SEQ ID NO:351).
BASE COUNT 112 a 125 c 92 g 158 t
ORIGIN
45 1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt gggtgtggg ttctggttt ttcacatcatttccaccac ttccatgg
121 actaaatctt gacttctgtg cctccaaacgt cgttgatcat ttctactgtg acactatccc
181 gtcctgcag attccctgca cagacacgcgca gtcctggag aggatggat tcatctcagc
241 gctggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
301 gacaattcta aaaatccctt caactagtca gagggaaaaag gcttttcca cgtgtcttc
361 tcacatgatt gtgatatccc ttcttatgg cagctgcattt tcacatgtatg ttaagccatc
421 agtcaaacaa agggtatctt ttcaaaagg aatttcgggtg ctaataacct ctgttgctcc
481 acttttg (SEQ ID NO:352).

OR214

LOCUS AF179835 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO215) gene, partial cds.

5 ACCESSION AF179835

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

25 gene <1..>487

/gene="SBO215"

CDS <1..>487

/gene="SBO215"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTLLMSHSICVNTVIVCWSISIAGALIYTVFTLHLP

YCGPYKINHFFCEVPAVLKLACADTSFNDRLDFILGFLLLVLPLSFILASYVLIFASI

FRIRSVQGRLKSFSTCASHVTVVTMFYGPAAIMYMRPGSWYDPEWDKKVEVLYNISA

FL" (SEQ ID NO:353).

35 BASE COUNT 86 a 142 c 104 g 155 t

ORIGIN

1 cgttgccatt tgcttcccc ttcaactatac gctactcatg agccattcca ttttgtcaa

61 cacgggtcatt gtctgttgtt ccattagcat agctggggcc ctgatctaca ctgtttcac

121 ctggcatctg ctttatttgtt gcccctacaa gataaacacc ac ttcttcgtt aggtccctgc

181 tgtcctgaag ttggcctgtt cagacacatc tttaatgac aggctggact tcattttggg

241 ttccctccctg ctttggcc cactctcctt catccctggcc tcttacgtac tcatacttg

301 ctctatcttc agaatccgct cagtgcaggg gaggtcaag tccttctcca cgtgtgcitc

361 ccacgtcaact gggttccacca ttttctacgg accggccatc atcatgtaca tgaggcccg

421 ttcttggat gaccaggat gggacaagaa ggttagagggt ttgtacaatg tcatacttcg

481 ctcttgc (SEQ ID NO:354).

OR215

LOCUS AF179836 487 bp DNA PRI 31-DEC-2000

50 DEFINITION Saimiri boliviensis olfactory receptor (SBO216) gene, partial cds.

ACCESSION AF179836

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"

10 gene <1..>487
/gene="SBO217"

CDS <1..>487
/gene="SBO217"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICHPLYYSTVMSPQVCALILVLCWVLNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSCSDTHINEMMVFLGGTVLIIPFLCIVTSYIYIVPAI
LRVRTHGGAGKAFSTCSSHLCIVCVFYGTLFSAYLCPPSIASEDKDIATAAMYTIVTP
TL" (SEQ ID NO:357).

20 BASE COUNT 89 a 151 c 100 g 147 t

ORIGIN

1 tgtggccatt tgccacccccc tctactactc cacagtcatg agcccccaag tctgtgcctt
61 aatcctcggt ttgtgttggg tcctcaccaa cgttgtgcc ttgacccaca cactcctcat
121 ggctcgactg tccttcgtg tgactgggaa aattgctcac ttttctgtg acatcactcc
181 tgtctgaag ctatcatgtt ctgacacccca catcaatgag atgatggtt ttgtcttggg
241 aggcacaga ctcatcatcc cctttctatg cattgtcacc tcctacatct acattgtgcc
301 tgctattctg agggtccgaa cccatggtgg ggcggggcaag gcctttcca cctgcaggcc
361 ccacctctgc attgttgtg tggcttatgg gaccctcttc agtgccctacc tggtccctcc
421 ctccatcgcc tctgaagata aggacattgc aacagc:gca atgtatacca tagtgactcc
481 cacgtt (SEQ ID NO:358).

OR217

LOCUS AF179838 486 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO218) gene, partial cds.

ACCESSION AF179838

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

50 FEATURES Location/Qualifiers

source 1..486

/organism="Saimiri boliviensis"
/db_xref="taxon:27679"

gene <1..>486
 /gene="SBO218"
 CDS <1..>486
 /gene="SBO218"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVGLAVAHMGNIMFMT
 FCSENLVNHYMCDVLPLLELSCNSSYINLLLVIIVAIIGIGVPIVTIFISYGFILSSI
 LHISSTEGRSKAFSTCSSHIIVVSLFFGSGAFMYLKPPSILPLDQGVSSIFYTAVVP
 C" (SEQ ID NO:359).
 BASE COUNT 92 a 114 c 105 g 175 t
 ORIGIN
 1 cgtagctatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tggcttgct
 61 ccttttgtt gggtgtatcg ggatgggggt ttgggggctt gtggctata tggaaacat
 121 aatgtttatcg accttttgtt cagaaaaatct tgcataatcac tacatgtgt atgccttcc
 181 cctccctttagtgc ctctcgtca acagctcta cataaaattt ctgtgttt ttattttatgt
 241 gcccattggc attgggggtgc caattgtcac catttttacat tcttatggtt ttattcttc
 301 cagcatttc cacattagct ccacagaggg caggtctaaa gccttcagta cctgcagtc
 361 ccacataattt gttgtatgc tttttttggt gtcaggagct ttatgttacc tcaaaccacc
 421 ttctattctca cccctggacc agggaaagt gtctccatt ttatatactg cagtgggtcc
 481 atgttt (SEQ ID NO:360).

OR218

LOCUS AF179839 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO219) gene, partial cds.
 ACCESSION AF179839
 KEYWORDS
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>487
 /gene="SBO219"
 CDS <1..>487
 /gene="SBO219"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVYFISHVA
 FCGSNVMNLFFCDISPVLKLACKDMSTAELVDFALAVIPLITIISYIYIVSAI"

LHIPSTQGRKKAFSTCASHLTIVIIFYTAMIFTYVRPRAIASFNSNKLISAVYAVLTP
ML" (SEQ ID NO:361).

BASE COUNT 111 a 136 c 78 g 162 t
ORIGIN

5 1 tgtggccatt tgccaccctc ttcaatactc agtcatcatg accacaggtt actgtggaca
61 gctggtgctt ttctttaca tgagtggttt catgtatctc gtcataagg tctattcat
121 ttacatgtt gcttctgtg getccaatgt tatgaacctc ttttctgtg atatctcacc
181 agtcttaaaa ctggcatgca aagacatgtc cacagctgag ctatggact ttgccttagc
241 tattcgattt ctgtgatcc ctcttattac cactatcctc tcttatatc acattgtctc
10 301 cgccattctg catataccct ccacccaggg aaggaagaag gccttctcca cctgtgcac
361 tcacctact gtatgtatc tttttacac accatgatt ttatcatatg ttggccca
421 agtattgtca tcatttaatt ccaacaaact aatctcagct gtctatgcag tcctcacacc
481 catgcta (SEQ ID NO:362).

15 **OR219**

LOCUS AF179840 488 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis SBO220 pseudogene, partial sequence.

ACCESSION AF179840

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

25 REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..488

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>488

/gene="SBO220"

/pseudo

40 BASE COUNT 112 a 126 c 92 g 158 t

ORIGIN

45 1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gctgtgcctt ggggtgggg ttctggttt ttcatacatc ttccacccac tctctttagg
121 actaaatctt gacttctgtg cctccaacgt cgttgatcat ttctactgtg acactatccc
181 gtcctgcag atttctgtca cagacacgcgca gtcctggag aggatggat tcatctcagc
241 gctggtgaca ctcttagtca cattggataat ggtgataata tcataatactt atattgcct
301 gacaattcta aaaatccctt caactagtca gagaaaaag gctttttcca cgtgttc
361 tcacatgatt gtatgtatcc ttctttatgg cagctgcccatttcatgtat gtaagccat
421 cagtcacaaaca aagggtatct ttcaaagg gaatttcgggt gctcaatacc tctgttgc
481 cacttttg (SEQ ID NO:363).

OR220

LOCUS AF179841 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO221) gene, partial cds.

5 ACCESSION AF179841

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
25 gene <1..>487
/gene="SBO221"
CDS <1..>487
/gene="SBO221"
/codon_start=2
/product="olfactory receptor"
/translation="VAICLPLHYATIMSPMLSRSLSVALSWVLTTFHAMLHTLLIARLR
FCADNVIFHFFCDMSALLKLACSDTRVNELVIFIMGLLIVIPFLIIGSYARIVFSI
LKVPSSKGICKAVSTCGSHLSVVSFYGTIVIGLYLCPSANNSTLKETVMAVMYTVMAP
ML" (SEQ ID NO:364).

35 BASE COUNT 85 a 139 c 103 g 160 t

ORIGIN

1 cgtggccatc tgccctcccc tacattacgc caccatcatg agccccatgc tgtctcgctc
61 cctgggtggcg ctgtcctggg tgctgaccac ctccatgcc atgttgccaca cttaactcat
121 agccagggtt cgttttgtg cagacaatgt gtatccac ttttctgtg atatgtctgc
40 181 tctgctgaag ctggcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatgg
241 aggcctcatt ctgtcatcc catttctact tatcatggg tcctacgcac gaattgtctt
301 ctccatcctc aaggcccctt ctctcaaggg tatctgcaag gccgtctcta ctgtggctc
361 ccacctctct gtggtgtcac tgcctatgg gactgttatt ggctctact tatgccatc
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgcgtggcccc
481 catgctg (SEQ ID NO:365).

OR221

LOCUS AF179842 487 bp DNA PRI 31-DEC-2000

50 DEFINITION Saimiri boliviensis olfactory receptor (SBO222) gene, partial cds.

ACCESSION AF179842

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO222"
CDS <1..>487
20 /gene="SBO222"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLA
FCAGNLVNHYMCDILP
LELSCNGSYINV
LVIFIVVTIGIGVPI
VAIFISYGFILSSN
LHISSAEGRSKAFSTCSSHIIAVSLFFGSGAFMYLK
PSSVLPLDQGVSSLFY
TIVVP
MF" (SEQ ID NO:366).
25 BASE COUNT 86 a 120 c 105 g 176 t
ORIGIN
30 1 cgtggccatc tgtaacccac tgctgtacat ggtcaccatg tctccccagg tgggtttgtct
61 ctttttgtt ggtgtctatggatgggggt ttgggggctt gttggctatc cagggaaatat
121 agttttctta accttttgtagggcaacctt tgtaatcac tacatgtgtt acatcctcc
181 ccttcctgag ctccctgcataatgtt ctggcatct ttattgtgtt
241 gaccattggc atgggggtgc ccatttgtgc cattttatc tcttatgggtt ttatcttc
301 cagcaatctc cacattgtt ctgttgaggc caggctaaatc gccttcagttt cctgcagtc
361 ccacataatttgcatgttccgg gtcaggagat ttatgttacc tcaaaccctc
421 ttccgttttccctggacc aggggaaagt atcctccctg ttatatacta ttgtgggtcc
481 catgttt (SEQ ID NO:367).

OR222

40 LOCUS AF179843 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO223) gene, partial cds.
ACCESSION AF179843
KEYWORDS
45 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"

10 gene <1..>487
/gene="SBO223"

CDS <1..>487
/gene="SBO223"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
FCTDLEIPHFFCELNVQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGHYSYSKIVSSI
RAI\$SAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMYTVVTP
ML" (SEQ ID NO:368).

20 BASE COUNT 101 a 134 c 98 g 154 t

ORIGIN

1 tgtggccatc tgtaaaaaaa tgcaactacac agtaccatt aacccagac tgtgtggact
61 gctggttctg gcatccctgga tcctgagtgc cctgaattcc tcattacaaa cttataatcg
121 gctggcgatc tccttcgtca cagacttgga aatccccac ttttctcg aacttaatca
181 ggtcatacat ctggcgtt atgacactt ccttaatgtatgttggcagc
241 tatgtgtcg ggcgggtggc ccctcacagg aattattac tcttactcta agatagttc
301 ctccatatacg tcaatctcat cagctcaggga gaagtacaag gcgtttcca cctgtgcac
361 tcacatctta attgtctctt tattttatgg tacactccta ggtgtgtacc tttagttctgc
421 tgcactggc aactcacatt caagtgc tgc agcctggatgtacactg tggcacc
481 catgctg (SEQ ID NO:369).

OR223

LOCUS AF073959 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR1-72M15 olfactory receptor gene,
partial cds.

35 ACCESSION AF073959

KEYWORDS

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

40 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

DRAFT

source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR1-72M15"
 5 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 10 /codon_start=2
 /product="olfactory receptor"
 /translation="IADIGFTSTTIPKVLQTIHTQSKFISFGCITQIFFIVFGCLD
 NLLLSVMAYDRFVAICHPLHYVVIMNSCFVCVMLALGSWIVSVMSSLPETLTVRLSFC
 TNMEIPHFFCDLPEVLKLACSDTLVNNIVTYSITIVIAGFPFSGILLSYSKIFSSILR
 15 IPSAGGKYKAFSTCGSHLLVVFLFYSNGLGVYLSSAATSSSRMSLVASLMYSIVTP" (SEQ ID
 NO:370).
 BASE COUNT 139 a 171 c 119 g 220 t
 ORIGIN
 20 1 catatgcac atcggttca cttccaccac tatccccaaag gttctgcaga ctatccacac
 61 acagagcaaa ttcatcttt ttcgggctg catcacacag atatttct tcatttgttt
 121 tggatgcctg gacaattac tcctatcagt gatggcctat gaccgccttg tgcccatctg
 181 ccatcccttg cactatgtgg tcatcatgaa ttcttgcttc tggatgtgc tgccatctgg
 241 atcatggata gtcagcgtca tgagttccct acctgagacc ttgactgtgt taagactatc
 301 ctctgtaca aacatggaaa ttccacactt ttctgtgtat ctcccgaaag tcttgaagct
 361 tgccgttctt gacacccttg ttaataacat tggatcatat tctataacca tagtcatagc
 421 tggtttccca ttctctggga ttctatgttc ttatcttaag attttctctt ccatccaaag
 481 aattccctca gctggggca agtacaaagc cttttctacc tggggcttc atctttgg
 541 ggcttctta ttctatagca atggcttgg ggcttaccc agtctgcag ccacatcatc
 30 601 ttcttagaatg agtcttagtg cctcactgat gtacagcata gtcactccc (SEQ ID NO:371).

OR224

LOCUS AF073960 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR1-72M16 olfactory receptor gene,
 35 partial cds.
 ACCESSION AF073960
 KEYWORDS
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 45 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 50 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

DNA BANK

	FEATURES	Location/Qualifiers
	source	1..649
		/organism="Mus musculus domesticus"
5		/sub_species="domesticus"
		/db_xref="taxon:10092"
		/clone="OR1-72M16"
	mRNA	<1..>649
		/product="olfactory receptor"
10	CDS	<1..>649
		/note="region between transmembrane domains TM2 and TM7."
		/codon_start=2
		/product="olfactory receptor"
15		/translation="FSDFCFSSVTIPKLLQNMQSQVPSIYAGCLAQMYFFLLFADLE SFLLVAMAYDRYVAICFPLHYTSIMSPKLCLCLVALSWLLTIVSHTLLMARLSFC ANNVIPHFFCDMSALLKLACSDIQINKLMIFILGGLVIIVPFLLIFSSYARIVSSILK VPSSRSIRKAFTCGSHLSVSLFYGTIIGLYLRPSANNSTIKETVMAVMYTVVTP" (SEQ ID NO:372).
	BASE COUNT	129 a 184 c 120 g 216 t
	ORIGIN	
20		1 ctctctgac ttctgtttt cctctgtgac cattccaaa ttgtgcaga acatgcaaag 61 ccaagttcca tcataccct atgcagggtt cctggcacaa atgtactttt ttctgtttt 121 tgcagatctc gagagcttc ccctgtggc catggcctat gatcgctatg tggccatctg 181 ctcccccta cactatacta gcatcatgag ccccaagctg tgtctgtcc tgggtggact 241 atcttgctca ctgaccacag tcatctctt gtacacacaca ctgctcatgg ctggcgtctc 301 ctctgtgtca aacaatgtga ttctctactt ttctgtgtat atgcagctc ttctgaagt 361 agcctgctc gacattcaga tcaataagtt gatgatattt atcttggggag gacttgtcat 421 tattgtccca ttctgtctga tattttcatc ctatgcacga atatgtcct ccattctcaa 481 ggtcccccttctctagaagca tccgcaaggc ttctccacc tgggttccc acctctctgt 541 ggtgtcttcttctatggga caatcatgg tctctatcta cgccatcag ctaataattc 601 aaccattaag gagactgtca tggctgtat gtacacgggtt gtagccccct (SEQ ID NO:373).
25		
30		

OR225

35	LOCUS	AF073961	649 bp	DNA	ROD	12-JUL-1999
	DEFINITION	Mus musculus domesticus clone OR10M olfactory receptor gene, partial cds.				
	ACCESSION	AF073961				
	KEYWORDS					
40	SOURCE	western European house mouse.				
	ORGANISM	Mus musculus domesticus				
		Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.				
	REFERENCE	1 (bases 1 to 649)				
45	AUTHORS	Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.				
	TITLE	Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional				
	JOURNAL	Unpublished				
	REFERENCE	2 (bases 1 to 649)				
50	AUTHORS	Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.				
	TITLE	Direct Submission				
	JOURNAL	Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,				

France
FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR10M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE
 SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTTFHAMLHTLLMARLSFC
 EDNVIPHFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK
 VPSARGIRKAFTCGSHLSVVSFYGAIIGLYLCP\$ADNSTVKETVMAMMYTVVTP" (SEQ ID NO:374).
 BASE COUNT 120 a 185 c 141 g 203 t
 ORIGIN
 1 ctctctgtat ctctgtttt cctctgtcac aatgccaaa ttgctgcaga acatgcagag
 61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtactttt tcctgcctt
 121 tggagacattt gagagttcc tccttgtgc catggctat gaccgctatg tggccatctg
 181 ctccccctt cattacatga gcatcatgag ccccagccctc tggttgatgc tgggtgtct
 241 gtctgggtt ctgaccactt tccatgccat gctgcatacc ctgtcatgg ccagattgtc
 301 attctgttag gacaatgtga tccccactt ttctgtgac atgtgtctc tgctgaagct
 361 gtccgtctt gacactcacg ttaatgaattt ggttatattt gtcacaggag gcctgtatcc
 421 tgcattcca ttgtgtctca tcccttgttc ctatgcacga attgtgtctt ccatttctcaa
 481 ggtcccgctt gtcgaggca tccgtaaagc cttctccacc tgfggtccc acctgtctgt
 541 ggtgtactt tttatgggg caatcatgttgc tctgtactta tgccatcg ctgataactc
 601 tactgtgaag gaaactgtca tggccatgtat gtacacagtg gtgactccc (SEQ ID NO:375).

OR226

35 LOCUS AF073962 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR11M olfactory receptor gene,
partial cds.
ACCESSION AF073962
KEYWORDS .
40 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
45 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
50 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers
source 1..649
5 /organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR11M"
mRNA <1..>649
10 /product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
15 /translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYGGCLAQIFFMLFGDME
SFLLVAMAYDRYVAICPLHYTSIMSPKVCTFLVLLLWILTPHATMQILLTVRLSFC
ENNVLNFFCDIFVLLKLACSDTYVNDLMLIMGGIIVIPFLIVISYARISSLK
VPSTQGIHKVFSTCGSHLSVVSFYGTIIGLYLCPSGNFSLKGSAMAMMYTVVTP" (SEQ ID
NO:376).
20 BASE COUNT 143 a 160 c 122 g 224 t
ORIGIN
1 ttctctgac ctctgtttt cctctgtcac aatgccaaa ttgctgcaga atatgcagag
61 ccaggaccca tccatcccct atggagggttg cctggcacaa atattctctt ttatgcttt
121 tggagacatg gaaagcttcc ttctgttagc catggcctat gaccgctatg tgcccatctg
181 cttccctctg cattacacta gcatcatgag tcctaaggtc tgtactttc tagtgctact
241 gttgtggata ctgacaacac cacatgccac aatgcaaatt ctgctcacag taagactgtc
301 ttttgtgag aacaatgtgt ttctcaactt ttctgtgac atatttgttc tcttaaagct
361 ggcctgctca gacacttatg ttaatgattt gatgatactt atcatgggag ggctcatcat
421 tgttattcca ttctgtctca ttgttatactc ctatgcaagg atcatctctt ctactcttaa
30 481 gttccatct actcaaggca tccacaagggt ctctcttacc tgtggcttc atctgtctgt
541 ggtgtctctg ttctatggga caattattgg tctctactta tgccatcag gtaataattt
601 cagtctaaag gggctgcca tggctatgtat gtacacagtg gtgactccc (SEQ ID NO:377).

OR227

35 LOCUS AF073963 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR12M olfactory receptor gene,
partial cds.
40 ACCESSION AF073963
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
45 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
50 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

5 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR12M"
10 mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDTSISYAGCLTQMYFLLVFGDLE
SILLVMAYDRYVAVCFPLHYMSIMSPTLCVCLLVLWSWFTVLYSMLHTLLSRLSFC
EDNLIHHFFCDISALLKLACSDIHINELMIFIMGGLVSIIPFLLIVVSYIQIVYSILK
ISSAHVLHKIFSTCGSHLSVSLFYGTIFALYLCPSANNSTVKEISMAMMCTVVTP" (SEQ ID
20 NO:378).
BASE COUNT 134 a 159 c 122 g 234 t
ORIGIN
1 ctctctgtat ctctgtttt cctctgtcac aatgccaag ttgtacaga acatgcagag
25 61 ccaggacacg tccatctcct atgtggctg tctgacacaa atgtactttt tattggtttt
121 tggagacctg gagagcatcc ttcttttgtt catggcttat gaccggtag tggctgtctg
181 ctccccctt cattacatga gcatcatgag ccccacact tggtgtgtc tgctagtgtt
241 atcctggta ttactgtgc tggatctat gtgcacact ctactctgtt cttagattgtc
301 attctgtgag gataacttga tccaccactt ttctgtgac atatcgccc tgctcaagtt
361 ggcttgetct gacattcata ttaatgaattt aatgatattt atcatggag ggcttgtag
421 catcatccca ttcttactca ttgtgtgtc ctatatacaa attgtctactt ccattctaaa
481 gatttcatct gctcatgtt tacacaagat ttctccacc ttgtgggtccc acctgtctgt
541 agtctcaactg ttctatggaa caattttgc ttctactta ttgtccatcag ctaataactc
601 tactgtgaag gagattcca tggccatgat gtgcacagtgtgactccc (SEQ ID NO:379).

35 OR228

LOCUS AF073964 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M19 olfactory receptor gene,
40 partial cds.
ACCESSION AF073964
KEYWORDS
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
45 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
50 potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 5 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 10 /clone="OR15-71M19"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 15 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDIGFISTTPKMLVNIQTQSKSISYAE~~CITQIYFFMLFGGMD~~
 ILLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQSLLMLRLSFC
 TNQIIKHFYCEYSRALTIACSDTLINHILLYYLICVLGFIPFSGILYSYCKIVSSILR
 20 IPSTDGKYKAFSTCGSHLSVVSLFYGTGLGVYLSSSDVTSSSGKDVVVASVMYTVVTP" (SEQ ID
 NO:380).
 BASE COUNT 153 a 151 c 112 g 233 t
 ORIGIN
 25 1 ctttctgac attggttca tctctacaac tatccctaag atgtggta atatccaaac
 61 acagagcaag tccatctcct atgcagaatg catcacccag atttatttt tcatgcttt
 121 tggaggcatg gacatacttc tcctaccgt gatggcctat gaccgattt tgccatctg
 181 tcacccctt cactattcg tcattatcaa tcccccaacta agtggctgc tggcttgt
 241 atcatggttt attagttttt catattctct gatacagagt ctattgtatc tgccgttgtc
 30 301 ctctgtaca aatcagataa ttaaacactt ttactgtgaa tattcttagag ccctcaat
 361 agcctgctca gacacactaa tcaafcatat ctttcttat attctgatat gtgtccttgg
 421 ctccatccct ttctcaggga tccttatttca atactgtaaa attgtttttt ctatttttgag
 481 aattccatca acagatggaa aatataaagc attttctacc tgtgggtctc atctatcagt
 541 ggittcttta ttctatggga caggccttgg tttttttttt agttctgtatc taacttcctc
 35 601 ctctggaaag gacgtggtgg cctcagtaat gtatacagt gtcacccct (SEQ ID NO:381).

OR229

LOCUS AF073965 643 bp DNA ROD 12-JUL-1999
 40 DEFINITION Mus musculus domesticus clone OR15-71M20 olfactory receptor gene,
 partial cds.
 ACCESSION AF073965
 KEYWORDS
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 45 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 643)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 50 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 5 FEATURES Location/Qualifiers
 source 1..643
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 10 /db_xref="taxon:10092"
 /clone="OR15-71M20"
 mRNA <1..>643
 /product="olfactory receptor"
 CDS <1..>643
 15 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCFSSVTVPKLLKDLLSAKKTISIEGCLAQVFFVFFPSGTE
 ACLLSVMA YDRYAAICHPLLYGQVMRNELCVRLVVISWGVASLNATIIVLLAVNLDFC
 GAQTIHHYTCELPALFPLSCSDISITVVVLLCSSLLHGLGTIPIFFSYARIVSAILS
 ISSTTGRSKAFSTCSSHLAAVTLFFSGFLCYLMPPSGSSLDLLSLQYSAVTP" (SEQ ID
 NO:382).
 BASE COUNT 98 a 203 c 142 g 200 t
 ORIGIN
 25 1 gttcgttagat ctctgcttct catccgtcac ggtaccgaaa ctgctgaagg acctccatac
 61 ggcgaagaaa accatctcaa tagaaggctg cctggctca gtccttttg tgttttcc
 121 ttctggtaact gaagecctgcc tgcctctgt catggcttat gaccgctatg ctggcatctg
 181 ccatccccctg ctctacggcc aggtgtatgg aaatgagttg tggtaaggc ttgtggatcat
 241 ctcatggggc gtggcctctc tcaacgcac catcatcgat ctctggctg tcaacctggaa
 301 ctctgtggg gtcacaaacca tcaccaacta cacctgttag ctgcctgccc tttccccctt
 361 gtccgttcc gatatctcca tcaactgttgt cgtccctgctt tgctccagct tgctgcattgg
 421 gctggaaacc ttatcccta tcttcttc tcatgcccgc attgtctccg ccatcttgag
 481 catagttcc accaccggga ggagcaaggc ttctccacc tgctctccc acctcgctgc
 541 atggacccatgg ttcttgggt ctgggtttct tgctatctc atggcgectt ctggtttcc
 601 tctggacttg ctctgtcgat tgcagtacag cgcaagtacag ccc (SEQ ID NO:383).

OR230

40 LOCUS AF073966 643 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR15-71M21 olfactory receptor gene,
 partial cds.
 ACCESSION AF073966
 KEYWORDS
 SOURCE western European house mouse.
 45 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 643)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 50 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M24"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDICFTTIVPQMLVNLLTQRKTILFAQCLTQMYFFVAFGITD
 SFLLAAMAIDRYVAICNPLHYNTVMSPRRCRLLVVASWAWSHLHSLTHTILMGRLSFC
 GPNVIHHFFCDVQPLLTSCSDTSINELLAFTEGSVVIMSPFILLSLISIFTRTVLR
 VPSGEGRYKVFSTCGSHLTVALFYGTIISVYIRPSSTYSVTKDRVVTVIYTVVTP" (SEQ ID
 NO:386).
BASE COUNT 134 a 180 c 128 g 207 t
ORIGIN
 1 cctgggtggac atctgcgtta ccactgtcat cgtgccacag atgttagtga acttgctgac
 61 acagagaaaag acaatccctt ttgcccgatgt cctcactcaa atgtattttt ttgtggctt
 121 tggtattaca gacagttcc ttggcgtc gatggccatt gaccgctatg ttgctatttg
 181 caatccgctt cattacaaca cagtcatggat tccccaggcgc tgctgcgttc tgggtggc
 241 atctggcgtt gtgtcccatc ttcaactccct cacccacaca atttcatgg tgccgccttc
 301 ttctgtggaa cccaaatgtca ttcatcaactt ctgttgtat gtccagccac tgctgacact
 361 ctccgtctt gacacccatca tcaatggatctt ccgtccatcc acagaggct ctgttgata
 421 catgagccctt ttatctttat tgggtgtctt tataatcttca ttcaactcggtt ctgttctgag
 481 ggtcccttca ggggaaggaa ggtacaaaagt ttcttacc tgggggtctc acctcacagt
 541 tggtagcactt tgctatggaa ccataatatc agtgcacatt cggccctcat ccacccatc
 601 agtgcacaaaag gaccgagttt tcactgtcat ctatacaga gttacccca (SEQ ID NO:387).

OR232

40 LOCUS AF073968 649 bp DNA ROD 12-JUL-1999
DEFINITION *Mus musculus domesticus* clone OR18M olfactory receptor gene,
partial cds.
45 ACCESSION AF073968
KEYWORDS .
SOURCE western European house mouse.
ORGANISM *Mus musculus domesticus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Mus*.
50 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are

OR233

LOCUS AF073969 649 bp DNA ROD 12-JUL-1999
DEFINITION *Mus musculus domesticus* clone OR1M olfactory receptor gene, partial
cds.
ACCESSION AF073969
KEYWORDS .
SOURCE western European house mouse.
ORGANISM *Mus musculus domesticus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Mus*.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

DRAFT 24/250

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
5 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
10 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
15 /clone="OR1M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICPLHYTSIMSPKLCGCLMLLWMLTTSHAMMHTLLAARLSFC
ENNVILNFFCDLFVLLKLACSDTYVNELMIFIMSSLIVIPFFLIVMSYARIIASILK
20 VPSIQGIYKVFSTCGSHLSVTLFYGTIIGLYLCPSGNNSTVKGTVMAMMYTVVTP" (SEQ ID
NO:390).
25 BASE COUNT 142 a 161 c 123 g 223 t
ORIGIN

30 1 cttctctgat ctctgcctt cctctgtcac aatgccaaa ttgctgcaga atatacagag
61 ccaggaccca tccatcccct atgcaggctg cctggcacaa acatacttctt ttaggtttt
121 tggagatatg gagagctcc ttcttgccg catggctat gaccgctatg tgccatctg
181 cttccctctg cattacacca gcatcatgag tcccaaactc tgtggtgtc taatgctgc
241 attgtggatg ctaacaacat cccatgccat gatgcatact ctccttgag caagattgtc
301 ttttgtgag aacaatgtga tcctcaattt ttctgtgac ctatgttc tcctaaagct
361 ggcttgcgtca gacacittatg ttaatgagtt gatgatattt ataatgagtt ccctccat
421 ttttattccca ttttcctca ttgtcatgtc ttatgcaagg atcattgcct ccattctaa
481 gtttccatct attcaaggga tctacaagggt ctctccacc tgtggccc atctgtctgt
541 ggtgacccttg ttttatggga caattattgg tctctactta tgtccatcag gtaataattc
601 cacagtaaag gggactgtca tggccatgtat gtacacagtgtgactcccc (SEQ ID NO:391).

40

OR234

LOCUS AF073970 649 bp DNA ROD 12-JUL-1999
45 DEFINITION Mus musculus domesticus clone OR21M olfactory receptor gene,
partial cds.
ACCESSION AF073970
KEYWORDS
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 10 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR21M"
 15 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFTSASIPKMLVNIQTKNKVITYEGCISQVFFFILFGVLD
 20 NFLLAVMAYDRYVAICHPLHYMVIMNRRLCGFLVLGSWTTALNSLLQSSMALRLSFC
 TDLKIPHVFVCELNQLVLLACNDTFPNDMVMYFAAILLGGGPLAGILYSYSKIVSSIRA
 ISSSQGKYKASSTCASHLSVVSLFYSTLLGAYLSSSFTQNSHSTARASVMYSVVTP" (SEQ ID
 25 NO:392).
 BASE COUNT 150 a 156 c 122 g 221 t
 ORIGIN
 30 1 cttgcagac atctgctta ctctgctag catccaaag atgctagtga atatacagac
 61 aaagaacaag gtgataacct atgaagggtg catttctcaa gtattcttt tcatactatt
 121 tggagttta gataacttc ttctagctgt gatggctat gaccgatatg tggcaatctg
 181 tcaccctctg cactatatgg tcatcatgaa ccggccctc tggattt tagtttggg
 241 gcttgggtc aacaacagcat tgaattccct gctgcagagt tcaatggcac tgcggctgtc
 301 ctttgatac gacttggaaa ttccccactt tggttgtag cttaatcaac tggactact
 361 tgcctgataat gacacccccc ctaatgacat ggtgatgtac ttgcagcta tactgctggg
 421 tgggtgcctt ctgcgtggca tccttactc ttatctaaat agatttccctt ccatacggtc
 481 aatctcatca tcacagggga agtataaagc atcccccacc tgcgtatccc acctctcagt
 541 ttgttcaat ttctattctt cactcttggg tgcgtatctt agttctt ttacacaaaa
 40 601 ctacactca actgcacgag catctgtt gtacagtgtg gtcacccccc (SEQ ID NO:393).

OR235

LOCUS AF073971 649 bp DNA ROD 12-JUL-1999
 45 DEFINITION Mus musculus domesticus clone OR22M olfactory receptor gene,
 partial cds.
 ACCESSION AF073971
 KEYWORDS
 SOURCE western European house mouse.
 50 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

0
9
8
7
6
5
4
3
2
1
0

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
 5 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 10 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 15 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR22M"
 mRNA <1..>649
 /product="olfactory receptor"
 20 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE
 SFLLVAMA YDRYVAICFPLHYMSIMSPSLCVSLVLLSWLTTFHAMLHTLLMARLSFC
 EDNVIPYFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK
 VPSARGIRKAFTSTCGSHLSVSLFYGTIIGLYLCPSADNSTVKETVMAMMYTVVTP" (SEQ ID
 NO:394).
 BASE COUNT 121 a 184 c 140 g 204 t
 30 ORIGIN
 1 cttctctgat ctctgtttt cctctgtcac aatgccaaa ttgtcgcaga acatgcagag
 61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtacttt tcttgcttt
 121 tggagaccctt gagagcttcc cccttgtggc catggcttat gaccgctatg tggccatctg
 181 ctccccctt cattacatga geatcatgag ccccgccctc tggtgagtc tgggtgtget
 241 gtcctgggtg ctgaccactt tccatgccc gtcgtatcc ctgtcatgg ccagattgtc
 301 attctgtgag gacaatgtga tcccactt tttctgtac atgtctgctc tgctgaagct
 361 gtcctgtct gacactcagc ttaatgaatt ggtgatattt gtacaggag gcctgtatct
 421 tgtcattcca ttgtgctca cccttgtgtc ctatgcacga atttgtcct ccattctcaa
 481 ggcccgctc gtcgaggca tccgtaaagc ctctccacc tgggggtccc acctgtctgt
 40 541 gggtcactg ttctatggga caatcatgg tctgtactta tgccatcag ctgataactc
 601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtactccc (SEQ ID NO:395).

OR236

45 LOCUS AF073972 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR25M olfactory receptor gene,
 partial cds.
 ACCESSION AF073972
 KEYWORDS
 50 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 5 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 10 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 15 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR25M"
 mRNA <1..>649
 20 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 25 /translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
 SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLTRLSFC
 KNNVIPHFFCDLSALLKLACSDIHNELMIMIIGALVVILPFLIIIVSYAHIVSSILK
 VPSTRGIHKVFSTCGSHLSVSLFYGSIVLYLCPSSNNSTVKDTVMSMMYTVVIP" (SEQ ID
 NO:396).
 30 BASE COUNT 136 a 163 c 118 g 232 t
 ORIGIN
 1 cttaactgac ctctgcgtt ctactgtcac aatgccaa ttccctgcaaa acatgcagag
 61 ccaagtatca tccattccct atgcaggctg cttgcacaa atgtacttct ttttgttttt
 121 cggtgatgtt gagagttac tccctgttgc catggcctat gaccgttag tgcccatctg
 181 ctcccctt cattatacca gaatcatgag cccaaacctc tggcgttgc tggcgtct
 241 gtcctggca ctgacaacat tggatgccc tggcactact ttgccttaa ctgggttgc
 301 ttctgttaaa aacaatgtga tccccattt ttctgtgac ctggcgtct tcctgaagct
 361 ggcctgctct gatattcaca ttaatggat aatgataatg ataattggag cacttgttgc
 421 tatacttcca ttctactca tcatagtgtc ttatgcgcac attgtcttcc ctatctcaa
 481 agtccctca actcgaggca tccacaagggt ttctccact tgggggttc atctgtctgt
 541 gggtgactg ttctatgggt cagtcattgt tctgtactta tgccatcat ctaataactc
 601 tactgtgaag gatactgtca tgtctatgtat gtacactgtg gtgattccc (SEQ ID NO:397).

OR237

45 LOCUS AF073973 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR27M olfactory receptor gene,
 partial cds.
 ACCESSION AF073973
 50 KEYWORDS
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

5 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

10 TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

15 FEATURES Location/Qualifiers

source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR27M"

20 mRNA <1..>649
/product="olfactory receptor"

CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2

25 /product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICSPHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSCF
KNNVIPHFFCDLSALLKLACSDIHNELMIMII GALVVILPFLLIVSYAHIVSSTLK
VPSTRGIHKVFSTCGSHLSVVSLFYGSIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID
NO:398).

30 BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN

35 1 ctcaactgac ctctgcgtt ctactgtcac aatgccaaat ttccgtcaaa acatgcagag
61 ccaagtatca tecattccct atgcaggctg ccttgeacaa atgtacttct ttttgtttt
121 tggtgatgtt gagagtttac tccttgttc catggcttat gaccgttatg tggccatctg
181 ctccccctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tgtgtgtct
241 gtcctgggea ctgacaacat tgtatgcccatt gtgcacact ttgctctaa ctaggtgtc
301 tttctgtaaa aacaatgtga tccccattt ttctgtgac ctttctgtctc tccctgaagct
361 ggcctgtct gatattcaca ttaatggat aatgataatg ataattggag cactttgtt
421 tatacttcca ttctactca tcatagtgtc ttatgcgcac attgtctctt ccactctcaa
481 agtccctca actcgaggca tccacaagggt ttctcttact tttgggttctc atctgtctgt
541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
601 tactgtgaag gatactgtca tgtctatgtat gtacactgtg gtgactccc (SEQ ID NO:399).

45 OR238

LOCUS AF073974 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR28M olfactory receptor gene,
partial cds.

50 ACCESSION AF073974

KEYWORDS

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 5 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 10 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 15 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR28M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="VVDICYTSSGPQMLAHFLMEKKTISALCGTQLFFALTGGTE
 FLLLTAMAYDRYVAVCNPLRYTVVMNPRLCMGLAGVSWFVGVVNSAVETAVTMYLPTC
 GHNVLNHNACETLALVRLACVDITLNQVVLASSVVLMIPCSLVSLSYAHIVAAIMK
 IRSTQGRRKAFETCASHLTVVMSYSYGMALFTYLQPASTASAEQDKVVVIFYALVTP" (SEQ ID
 NO:400).
 BASE COUNT 119 a 183 c 166 g 181 t
 ORIGIN
 20 1 aggggtggac atctgctaca cctccagttgg ggtcccccaag atgtggcac acttccat
 61 ggagaaaaag accatcttt ttgcctatg tggacccag ctcttcattt ctctgactt
 121 tggggaaact gagttctgt tgctgactgc catggcttat gaccgctatg tggctgtctg
 181 taatccatta cggtacacag tggtgatgaa cccaaggctc tgcatggtc tagcaggtagt
 241 ctctgggtt gtgggttagt ttaattctgc tggggagaca gcagtcacca tgtacccat
 301 cacctgtggg cacaatgtac tcaaccatgt ggcctgttag acactggcac tggtcagact
 361 ggcctgtgt gacatcaccc tcaaccaagt ggtgatactg gcttcttagt tgggggtgt
 421 gatgatacc tgcctctgg tctctgttc ctatccccac attgtactg ccatacatgaa
 481 gatccgtct acccaggagc gcccggaaacg ctttggatcc tggctccat atctgactgt
 541 ggtctccatg tcttatggga tggccctt caccctacgt cagcctgcct ccacagccct
 601 tgctgagcag gacaaggtagt tagtgatctt ctatgtttt gtcacccccc (SEQ ID NO:401).
 25
 30
 35
 40
 45

OR239

LOCUS AF073975 649 bp DNA ROD 12-JUL-1999
 50 DEFINITION Mus musculus domesticus clone OR29M olfactory receptor gene,
 partial cds.
 ACCESSION AF073975
 KEYWORDS

SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

15 FEATURES Location/Qualifiers
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 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR29M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCQSSVIMPKMLEKFVMVKSVISFAECMAQFYLFDVFAVSE
 CHMLAVMAYDRYVAICNPLLYNVTMSYKVCSWMVVGVYSVGLICATGETVCLLRLFC
 KADDINHYFC DLLPLLEQSCSNTFINEILGLSFSSFTTVPALTILSSYIFIASIILR
 IPSTEGRSKAFSTCSSHILAVA VFFGSLAFMYLQPSSVSSMDQGKVSSVFYTIVVP" (SEQ ID
 NO:402).
 BASE COUNT 143 a 159 c 130 g 217 t
 ORIGIN
 35 1 ttctggac ctctgccagt ccagtgcat catgccccaa atgctggaga aatttgtcat
 61 ggtgaagagt gtcatttc ttgcagaatg catggctcg ttttacat tat ttgtatgttt
 121 tgctgttca gaggtgcaca tgctggctgt catggcttat gatcgctatg ttccatctg
 181 taaccccttg ctatataatg ttaccatgtc ttacaaaatgt tttccctgga tggtagtggg
 241 ggtgtatagt gtaggcttga ttgtgccac agggaaaca gtcgtcgtc tttagactgt
 301 attctgcaaa gctgtatgaca taaaccaacta cttctgtat ctttaccac tactggaaaca
 361 atccctgttcc aatacattt acaatgaaat actaggactg tcctcgtat catttaataac
 421 tactgtccca gctctgatcca tcctcgttcc ctatcatgtc atcatagccca gcatccctcg
 481 cttcccttcc actgaaggca ggtccaaatg ctccagcacc tgccatccc acatcttggc
 541 tggatgtc ttcttgggt cttagcatt catgtacattt cagccatcat cagtcagtc
 601 catggaccaa gggaaatgtt cttctgtgtt ttataccatt gtttgcc (SEQ ID NO:403).

OR240

50 LOCUS AF073976 649 bp DNA ROD 12-JUL-1999
DEFINITION *Mus musculus domesticus* clone OR2M olfactory receptor gene, partial
cds.
ACCESSION AF073976

KEYWORDS

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

5 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

10 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

15 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR2M"

20 mRNA <1..>649

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/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

30 SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHMSLHTLLLTRLSFC

ENNVIIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLVTVSYARISSILK

VPSTRGIHKVFSTCGSHLSVSLFYGTIIGLYLCPSANNSTLKDTVMSLMLTVVTP" (SEQ ID

NO:404).

35 BASE COUNT 126 a 177 c 123 g 223 t

ORIGIN

1 ctcaactgac ctctgccttt cctctgtcac aatgccaaag ttgctgcaga acatgcagag

61 ccaaggatcct tcaatccct atgcaggctg cctgacaccaa atgtacttct ttttgtttt

121 tggagatctt gagagcttcc tcccttgcc catggctat gaccgatatg tagccatctg

181 cttccctctt cattacacca gcattatgag ccccaggctc tggctgagtc ttgtgctgt

40 241 gtcctgggtg ctgaccatgt cccatccat gtcgcacact ttgctcttaa cttaggtgtc

301 ttctctgtgaa aacaatgtga tccccattt ttctctgtat ctgtctgctc tgctgaagct

361 ggcctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttggtgt

421 tatacttcca ttctactcg tcacagtgtc ttatgcacgc atcatctctt ccattctcaa

481 ggtcccttca actcgaggca tccacaaggt ttctccact tgggttctc acctgtctgt

541 ggtgtactgt ttctatggga caattattgg cctctactta tgtccatctg ctaataactc

601 tactctaaag gacactgtca tgtctctgtat gtacactgtg gtaactccc (SEQ ID NO:405).

OR241

50 LOCUS AF073977 650 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR3M olfactory receptor gene, partial cds.

ACCESSION AF073977

KEYWORDS

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

5 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

10 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

15 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..650
20 /organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR3M"
mRNA <1..>650
25 /product="olfactory receptor"
CDS <1..>650
/note="region between transmembrane domains TM2 and TM7."
/codon_start=3
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
30 IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVFCWFIVFYAMFHTLLARLSFC
KNNVIPHFFCDISALLKLACSDVYINELMILGGFLVTSLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSIFYGAIIGLYLCPANNSTEKETAMSLMYTVVTP" (SEQ ID
NO:406).

35 BASE COUNT 135 a 157 c 122 g 236 t

ORIGIN

1 ccttctctga tctctgcctt tcctctgtca caatgccaa gttgctgcag aacatgcaga
61 tccaggacac acccatatcc tatgtggcgtt gtctgacaca aatgtacttt ttcaagtgttt
121 ttggaagtct ggagatattc ctcttgtag tcctggccta tgaccgctat gtggccatct
40 181 gtttacccct tcaaatattcc agcatcatga gccccaatct ctgtgtgtt gtgggtgtt
241 tctgctgggt atttattgtt ttttatgccca tgittcacac actactcttg gctagattgt
301 cattttgtaa gaacaatgtg atccccactt tttctgtga catacttgcc ctctgaagt
361 tggcatgctc tgatgtttat attaatgaat taatgatact tatcttggga gggtttc
421 ttgcaccc actcttactc atcatgtat cctatgtaca aatgtctcc tcaattttaa
481 ggattcttc tactgggct atccataagc tcttctccac ctgtggctca cacctgtctg
541 tggctcaact gttctatggg gcaattattg gtctgtactt atgtccatca gctaataact
601 ctactgaaaa ggagactgcc atgtccctga tgtacacagt ggtgactccc (SEQ ID NO:407).

OR242

50

LOCUS AF073978 648 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR4M olfactory receptor gene, partial

cds.

ACCESSION AF073978

KEYWORDS

SOURCE western European house mouse.

5 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

10 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

15 TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

20 FEATURES Location/Qualifiers

source 1..648
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR4M"

25 mRNA <1..>648
 /product="olfactory receptor"

CDS <1..>648
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
 IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVFCWFIVFYAMFHLLLARLSFC
 KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLVISLLLIVSYVQIVSSILR
 ISSTRAIHKLSTCGSHLSVVSLFYGTIIGLYLCPANNSTEKETAMSLMYTVVTP" (SEQ ID

30 35 NO:408).

BASE COUNT 135 a 154 c 122 g 237 t

ORIGIN

1 ctctctgtat ctctgtttt cctctgtcac aatgccccaa ttgcgtcaga acatgcagat
 61 ccaggacaca cccatatcct atgtggctg tctgacaccaa atgtactttt tcagtgtttt
 121 tggagtgctg gagatattcc ttcttgttagt cctggccat gaccgctatg tgcccatctg
 181 ttacccctt caatattcca gcatcatgag ccccaatctc tttgtgtgtg tgggtgtgt
 241 ctgctggta ttatttgtt ttatgccc ttccacactt ttctgtgac atatctgcc ttctgaagtt
 301 atttgtaa aacaatgtga tcccacactt ttctgtgac atatctgcc ttctgaagtt
 361 ggcatgctct gatgttata ttaatgaattt aatgataactt atctggag ggttcttct
 421 tgtcatctca ctctactca tcattgtatc ctatgtacaa attgtctctt caatttaag
 481 gatttcctt actcgggcta tccataagct ctctccacc ttgtggctcac acctgtctgt
 541 ggtctactg ttctatggaa caattattgg tctgtactta ttgtccatcg ctaataactc
 601 tactgaaaag gagactgcca ttgtccctgtat gtacacagtg gtgactcc (SEQ ID NO:409).

OR243

LOCUS AF073979 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR5M olfactory receptor gene, partial
5 cds.
ACCESSION AF073979
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
15 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
20 TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR5M"
mRNA <1..>649
30 /product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
35 /translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYASCLTQMYFFMAFGNME
IYLLVVVAMYDRYVAICFPLHYTSIMSPKLCVSLVVLSWVFTILYSMLHTLLLARLSFC
EDNVIPHFFCDISALLKLACSDISINELMIFIVGLDTVIPFLLIVVSYVQIVCSILK
FSSTRGIHKVFSTCGSHLSVSVLFYGTIIGVYICPSANNSTVKETVMSLMYTVVTP" (SEQ ID
NO:410).
40 BASE COUNT 135 a 171 c 124 g 219 t
ORIGIN
1 ctctctgtat ctctgtttt cctctgtcac aatgcacaag ttgctgcaga acatgcagag
61 ccaggaccca tccatccccat atgcagctg tctgacacaa atgtacttt tcatggcttt
121 tgggaacatg gaaatttac ttcttggtt catggctat gaccgctatg tggccatctg
45 181 ctcccctttt cattacacca gcacatcatg ccctaagctc tgtgtgtctc tgggtgtct
241 ctctggta ttaccattc tgttccat gttacacacc ctactctgg caagattgtc
301 attctgtgag gacaatgtga tcccccaact ttctgtgac atatcgccc tgctcaagt
361 ggcctgctct gacatttcta ttaatgaact aatgtatattt atcgtgggag ggcttgatc
421 tgtaatccca ttttactca ttgtgtttc ctatgtacaa attgctgtct ccattctaaa
50 481 gttctcatct acacggggca tacacaaggt ctctccacc tggctcc accctgtctgt
541 ggtctcaatg ttctatggga caattattgg tgtctacata tgcccatcg ctaataactc
601 tactgtgaag gagactgtca tgtccctgtat gtacacagtg gtgacgccc (SEQ ID NO:411).

OR244

LOCUS AF073980 649 bp DNA ROD 12-JUL-1999
5 DEFINITION Mus musculus domesticus clone OR6M olfactory receptor gene, partial
cds.
ACCESSION AF073980
KEYWORDS
10 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
15 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
20 TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR6M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
30 /product="olfactory receptor"
/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE
SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHMSLHTLLLTRLSFC
ENNVIIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLVTVPYARISSILK
VPSTRGIHKVFSTCGSHLSVSLFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID
40 NO:412).
BASE COUNT 126 a 178 c 123 g 222 t
ORIGIN
1 cttaactgac ctctgccttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
61 ccaaggccct ctaaatccccat atgcaggctg cctgacacaa atgtacttct ttttgtttt
45 121 tggagatctt gagagcttcc tccttgccg catggctat gaccgatatg tagccatctg
181 ctcccctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgtcgct
241 gtcctgggtg ctgaccatgt cccatccat gctgcacact ttgctctaa cttagttgc
301 ttctgtgaa aacaatgtga tccccctttt ttctgtgat ctgtctgcgc tgctgaagct
361 ggccgtctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttggtg
50 421 tataacttcca ttctactcg tcacagtgcc ttatgcacgc atcatctctt ccattctcaa
481 ggcccttca actcgaggca tccacaaggt ctctccact tgtggttctc acctgtctgt
541 gggtgcactg ttctatggca caattattgg cctctactta tgccatctg ctaataactc

601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:413).

OR245

5 LOCUS AF073981 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR7M olfactory receptor gene, partial
cds.
ACCESSION AF073981
KEYWORDS
10 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
25 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR7M"
30 mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
35 /codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRLSFC
KNNVIPHFFCDLSALLKLACSDIHNELMIMIIGALVVILPFLLIIVSYAHIVSSILK
40 VPSTRGIHKVFSTCGSHLSAVSLFYGSIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID
NO:414).
BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN
45 1 ctcaactgac ctctgccttt ctactgtcac aatgccaaat ttccctgcaaa acatgcagag
61 ccaagtatca tccattccct atgcaggctg ccttgccaaat atgtacttct ttttgttttt
121 tggtgatgtt gagagcttac tccctgttc catggcctat gaccgttagt tgcccatctg
181 ctccccctt cattatacca gaatcatgag cccaaacctc tggcgttagt tggtgctgct
241 gtcctgggca ctgacaacat tggatgccc tggcacaact ttgctctaa ctgggtgtc
301 ttctgtaaaa aacaatgtga tccccatatt ttctgtgac ctggctc tcctgaagct
361 ggccctgcctt gatattcaca ttaatggatggtt aatgataatg ataattggag cactgttg
421 tatacttcca ttctactca tcatagtgtc ttatgcgcac attgtctctt ccattctcaa
481 agtcccttca actcgaggca tccacaaggt ctggctc actgtctgc

541 gggtcactg ttctatgggt cagtcattgt tctgtactta tgccatcat ctaataactc
601 tactgtgaag gatactgtca tgctatgtat gtacactgtg gtgactccc (SEQ ID NO:415).

OR246

5 LOCUS AF073982 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR8M olfactory receptor gene, partial
cds.
10 ACCESSION AF073982
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
15 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
25 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR8M"
30 mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLWMLTTSHAMMHTLLAARLSFC
40 ENNVILNFFCDLFVLLKLACSDTYVNELMIFIMSSLIVIPFFLIVMSYARIIASILK
VPSIQGIYKVSTCGSHLSVVTLYGTIIGLYLCPSGNNSTVKGTVMAMMYTAVTP" (SEQ ID
NO:416).
45 BASE COUNT 143 a 162 c 123 g 221 t
ORIGIN
1 ctctctgtat ctctgtttt cctctgtcac aatgccaaat ttgtcgaga atatacagag
61 ccaggaccca tccatccccct atgcaggctg cctggcacaa acatacttctt ttatgtttt
121 tggagatatg gagagctcc ttcttgccat catggcttat gaccgctatggccatctg
181 cttccctctg cattacacca gcatcatgag tcccaaactc tgggttgct taatgtct
241 attgtggatg ctaacaacat cccatgccc atgcatact cccctgcag caagattgtc
50 301 ttttgtgtag aacaatgtga tcctcaattt ttctgtgac ctatgtac tcctaaagtt
361 ggcttgctca gacactttagt ttaatgagtt gatgatattt ataatgagtt ccctcctcat
421 tggatattcca ttttcctca ttgtcatgtc ttatgcaagg atcattgcct ccattctaa

481 ggttccatct attcaaggga tctacaagggt cttctccacc tgtggitccc atctgtctgt
541 ggtgaccttg ttttatggga caattattgg tctctactta tgccatcg gtaataattc
601 cacagtaaag gggactgtca tggccatgtat gtacacagecg gtgactccc (SEQ ID NO:417).

5 **OR247**

LOCUS AF073983 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M4 olfactory receptor gene,
partial cds.
10 ACCESSION AF073983
KEYWORDS
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
15 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
20 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
25 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
30 /sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M4"
mRNA <1..>649
/product="olfactory receptor"
35 CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFAELD
40 NFLLAVMAYDRYVAICHPLYYTVIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
GDVKIPHFFCELNQLSQLTCSDSFSSQLIMNLVPVLLAVISFSSILYSYFKIVSSICS
ISSVQGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSVVIQSSHSAARASVMYTVVTP" (SEQ ID
NO:418).
45 BASE COUNT 148 a 157 c 118 g 226 t
ORIGIN
1 ctttgtggac atctgtttt cctccaccac tgtccaaag atgtggtaa atatacagac
61 tcaaaggcaag gccattacat atgcagactg tattagccag atgtctgtct tcttgggttt
121 tgcagaattt gacaacttc tccctggctgt gatggcctat gaccgatatg tggctatctg
181 tcacccatta tattacacag tcattgttaa ccaacatctc tgataactga tggttctgtct
50 241 gtcctgggtt gtttagcatcc tacatgccctt cttagcagac tcaattgtgc tacagtgtac
301 cttttgtgga gatgtaaaaa ttccccactt ctctgtgag cttaaaccacg tgtctcaact
361 cacatgttca gacagccaact cataatgaat ctgtacatgt ttctattggc

421 agtcattcc ttcaagtagta tccttactc ttatccaag atagtgcct ccataatgttc
481 ttcctccta gttcaaggaa agtacaaggc atttctaca tggctctc accttccat
541 tgctccta tttataga caggcctgg agtgtatgc agttctgtg tgatccaaag
601 ctctcaactc gtgcagag cctctgtat gtatactgt gtcaccccg (SEQ ID NO:419).

5

OR248

LOCUS AF073984 646 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M6 olfactory receptor gene,
partial cds.
ACCESSION AF073984
KEYWORDS
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukarya; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
source 1..646
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M6"
mRNA <1..>646
/product="olfactory receptor"
CDS <1..>646
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="SVDVCFSSTTVPKVLAIHILRNQAISFGCLTQLYFLCVFADMD
NFLLAVMAYDRFVAICHPLHYTTKMTHQQLCAFLVVGSWMVASLNALLHTLLVAQLYFC
GDNVIPFFCEVTPLLKLSCSDTHLNEMLILAVAGLIMLAPFVCILLSYILIACAILK
ISSTGRWKAFSTCGSHLAVVCLFYGTIISLYFNPSSSHSAGRDMAAMMYTVVTP" (SEQ ID
NO:420).
45 BASE COUNT 128 a 178 c 133 g 207 t
ORIGIN
1 ctctgtggat gtatgtttc ctcaccac tgccttaag gtactggca ttcacatact
61 aagaaatcaa gccattcgt tctctgggtg ctcacacag ctgtatccc tctgtgtgtt
121 tgctgacatg gacaattcc tgctggctgt gatggcctat gaccgatttg tggccatatg
181 ccaccctta cactacacaa caaaagatgac ccatcagtt tgccttcc ttgtgtttg
241 gtcctggatg gtagccagtc tgaatgcctt gttgcacaca ctgctcgatgg ctcaactcta
301 ctctgtggg gacaatgtga tccccactt ctctgtgaa gtgactcccc tgctgaaact

361 ctcttgctca gacacacatc tcaatgagtt gatgattctt gctgtgcag ggctgataat
421 gtttagctcca ttgtttgca tcctcttgtc ttatatccctt attgttgtc ccatccgtaa
481 aatctcatcc acaggaagat ggaaaggcctt ctctacactgt ggctcacact tggttgtt
541 gtgccttc ttaggcacta tcatatccctt gtattcaac cccctatctt ctactcagc
5 601 tgggagggac atggcagctg ccatgatgtc cacagtggc accccc (SEQ ID NO:421).

OR249

LOCUS AF073985 650 bp DNA ROD 12-JUL-1999
10 DEFINITION Mus musculus domesticus clone OR912-47M7 olfactory receptor gene,
partial cds.
ACCESSION AF073985
KEYWORDS
15 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
20 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
25 TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
FEATURES Location/Qualifiers
30 source 1..650
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR912-47M7"
mRNA <1..>650
/product="olfactory receptor"
CDS <1..>650
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFGELD
NFLLAVMAYDRYVAICHPLYYTFIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
GDVRIPHFFCELNQLSQLTCSDSLSSHLMHLVPVLLGAISFSSILYSYFKIVSSICS
40 ISSVQGKYKAFSTCVSHLSIVSLFYSTGLGVVVSSAVVQSSHSAARASVMYTVVTH" (SEQ ID
NO:422).
45 BASE COUNT 148 a 159 c 121 g 222 t
ORIGIN
1 ctttgccatc atctgtttca cctccaccac tgtcccaaag atgctggtaa atatacagac
61 tcaaaaggat ggcattacat atgcagactg tattagccag atgtctgtct tcttggttt
50 121 tggagaactg gacaacttc tcctggctgt gatggcctat gaccgatatg tggctatctg
181 tcacccattg tattacacat tcattgttaa ccaacatctc tgataactga tggttctgtc
241 gtcctgggtt gtagcatcc tacatgcctt cttacagagc tcaattgtac tacagttgac

OR250

10 LOCUS AF073986 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M8 olfactory receptor gene,
 partial cds.
 ACCESSION AF073986
 KEYWORDS .
 15 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 30 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
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 mRNA <1..>649
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 CDS <1..>649
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 NFLLAVMAYDRYVAICHPLYYTFIVNQHLCILMVLLSWVVSILHAFLQSSIVLQLTFC
 GDVKIPHFFCELNQLSQLTCLDSFSSHLMNLVPVLLAVISFSSILYSYFKIVSSICS
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 45 NO:424).
 BASE COUNT 144 a 159 c 120 g 226 t
 ORIGIN
 1 ctttgtggac atctgttca cctccaccac tgtcccaaag gtgctggtaa atatacagac
 61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcctggttt
 121 tgcagaattg gacaacttc tctggctgt gatggcctat gaccgatatg tggctatctg
 181 tcacccatgt tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgtc

241 gtcctgggtt gttagcatcc tacatgcctt ttacagagc tcaattgtgc tacagtgc
301 ctttgtgaa gatgtaaaaa ttccccactt ctctcgag cttaccaggc tgtctcaact
361 cacatgtta gacagcttt caagccacct cataatgaat ctgttacctg ttctattggc
421 agtcattcc ttcagtagta tccttactt ttatccaag atagtgtctt ccatagttc
481 tatctctca gttcaaggga agtacaaggc atttctaca tggctctc acctttccat
541 tgcttccta ttatagta caggccctgg agtgtatgtc agttctgctg tggccaaag
601 ctctcaactt gctgcaagag cctctgtat gtatactgtg gtcaccccg (SEQ ID NO:425).

OR251

10 LOCUS AF073987 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR912-47M9 olfactory receptor gene,
partial cds.
ACCESSION AF073987
15 KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
20 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
25 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
30 France
FEATURES Location/Qualifiers
source 1..649
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35 /db_xref="taxon:10092"
/clone="OR912-47M9"
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CDS <1..>649
40 /note="region between transmembrane domains TM2 and TM7."
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45 GNNVINHFFCEPPALLKLASADTYSTEMAIFAMGVVILLAPVSLILTSYWNISTVIQ
MQSGEGRLKVFSTCGSHLIVVVLFYGSAIFAYMRPNSKIMNEKDKMISVFYSAVTP" (SEQ ID
NO:426).
BASE COUNT 141 a 175 c 146 g 187 t
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50 1 cttgcagat ctctgcttt ctactaccac agtgcccccag gtgttgtcc acttcctgg
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181 caaacctctg cactactcca ccatcatgac acactggcta tggttcagc tggctgcagg
241 gtcctggcc agtggtgac tttgtccct gggtggatacc acattcacat tacgtctcc
301 ttatcgagga aacaatgtca ttaaccactt ttctgtgaa cctctgc(cc) tcctgaagct
361 ggcacatggca gatacataca gcacagagat ggcgcattttt gcaatgggtg tgtaatcc
421 ccttagcacct gtctccctca tcctcacctc ctactggAAC atcatctcca ctgtaatcca
481 gatgcagtct ggggaaggaa ggctcaagggt ctctccacc tgggtctcc acctctttgt
541 tggttctc ttctacggct cagaattat tgcctacatg aggccccact ctaagataat
601 gaatgaaaag gataaaaatga ttccgggtt ctatcagca gtgacccccg (SEQ ID NO:427).

10 OR252

LOCUS AF073988 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR9M olfactory receptor gene, partial cds.
 ACCESSION AF073988
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
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 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR9M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
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 /translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE
 SFLLVAMAYDRYVAICPLHYTSIMSPRLCVSLVLLSWLLTMSHSMHTLLL
 ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLT
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 MYTV
 NO:428).
 BASE COUNT 126 a 177 c 123 g 223 t
 ORIGIN
 1 cttcactgac ctctgtttt cctctgtcac aatgccccaaatggctgcaga acatgcagag
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 181 ctccctctt cattaccca gcattatgag ccccaggcgc tggatgttttgc ttgtgcct
 241 gtcctggttt ctgaccatgt cccatccat gctgcacact ttgtcttaa ctaggttgc
 301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgc tgctgaagct
 361 ggcctgcctt gatattcaca ttaatgaattt ggtatattt atcataggag ggcttgttgc
 421 tatacttcca ttctactcg tcacagtgtc ttatgcacgc atcatctcctt ccattctcaa
 481 ggtccctca actcgaggca tccacaagggt ttctccact tggttttc acctgtctgt
 541 ggtgtcactg ttctatggca caattattgg cctctactta ttgtccatgtg ctaataactc
 601 tactctaaag gacactgtca ttgtctgtat gtacactgtg gtaactccc (SEQ ID NO:429).
 10

OR253

LOCUS AF073989 1865 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus clone OR1-72M13 olfactory receptor gene, complete cds.
 15 ACCESSION AF073989
 KEYWORDS
 SOURCE house mouse.
 ORGANISM Mus musculus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 20 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 1865)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 25 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 1865)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 30 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
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181 cagagacctt tctgaatgt cagaacttag tgtaaccact gaaaaatgtt gagaagtgaa
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361 agttctaagt agagataagg tagagaaact aataatgtg agaaaaatgca ggattcccaa
421 tttttattgt aataaaagct ttatgtacag ttatccaac acataaaagg acagagacct
481 tagagactgt agtgtatgtt cctcaatctt tcttcagg aggtgtctag ctatgtc
541 aacaacatga aaccagaaaa ccaaacaaaa tatttttagaa ttttgc tggggtttc
601 caatatccag agcatcaacc catgttattt ggactgttgc tgctcatgtt tggtgcgt
661 gtgcgggatc ttcttcattt cattctggcc gtcaaggatc actctcacct gcatactccc
721 atgtacttctt tctatctaa cctgtccctt tctgacattt gttcatctc tacaactgtc
781 cctaagatgt tggtaatattt ccaaacacag agcaagttca tctccatgc agaatgcattc
841 acccagattt atttttcat gcttttggaa ggcattggaca cacttcctt caccgtgtat
901 gcctatgacc gattttggc catgtgtcac ccacttcactt attcgtcat tataatctt
961 caactaagtgt gtttgcattt tcttgcattca tgggttattt gcttttcata ttctgtata
1021 cagagtcttat tggatgtcg tttttttttt tttttttttt tttttttttt tttttttttt
1081 tggtaatgt ccaagccct cactatagcc tgctcagata cactaatcaa tcatatccctt
1141 ctttatattt tgatatggg cttttttttt atccctttt caggatctt ttatcata
1201 tataaaattt ttctcaat ttgagaattt ccatcaacag atggaaaata taaaacattt
1261 tctacctgtt ggttcatatc atcgggtggg tttttttttt atggacagg cttttttttt
1321 tacccttagt ctgtgtcac ttccctctt gggaaaggccg tggccctt agtaatgtat
1381 acagggttca cccccatgtt gaacccttc atctacagct tgagggacaa agacattaag
1441 aaggccctaa aaacacttgg gagaatactt cttttaaagt gataatttca ctgggttttt
1501 acatctgtac tgatagaaat aaaatgtga actaaagaaa ttctgtacta taatcatgt
1561 gaaaattttt ccagggttggt ggttcatctt tgataaaaat tataatgtga atattttat
1621 ctgaaatttc tatgtatgttccctttttt tttttttttt tttttttttt
1681 tacgacatat ttctttactt cagttttttt tttttttttt tttttttttt
1741 caaataccaa ttcatgtatgtt gttttttttt tttttttttt tttttttttt
1801 catgtatata tatataacac tttttttttt tttttttttt tttttttttt
1861 tgcag (SEQ ID NO:431).

As used herein, the terms "ORX nucleic acid sequence" and/or "ORX nucleic acid molecule" specifically refer to the sequences of GenBank Accession Nos. AF022649

35 AF073959-073989, AF127814-127907, and AF179716-179843.

Likewise, the term “ORX polypeptide” specifically refers to the polypeptide sequences of GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-

179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839,
AF179841-179843, and AF073959-073989.

To sample the ORX genes in primate species, ORX genes were randomly sequenced from anthropoids and prosimians (*See* FIG. 1). As outlined in Examples 1-3, *infra*, ORX genes were obtained by PCR on genomic DNA from the different species using consensus ORX primer pairs OR5B-OR3B and OR3.1-OR7.1 chosen respectively in the transmembrane domains TM2 and TM7, and TM3 and TM7. Except for humans, eighteen to thirty-five individual ORX clones were sequenced per taxon. A total of 221 ORX sequences, representing ten species, was analyzed. These sequences are distributed in different groups whose percentage of nucleotide sequence identity (NSI) ranges from ~35 to >99%. The corresponding amino acid sequences were compared to a variety of ORX sequences from the public databases and previous studies. *See* Rouquier et al., (1998) *Nature Genet.* 18, 243-50.

All sequences have the characteristic features of olfactory receptors, with a heptahelical structure and conserved motifs as previously defined. *See* Buck et al., (1991) *Cell* 65, 175-187; Rouquier et al., (1998) *Nature Genet.* 18, 243-50; and Rouquier et al., (1998) *Hum. Mol. Genet.* 7, 1337-45. The use of two pairs of consensus primers made the sampling representative of the ORX gene repertoire. Primate sequences are distributed in seven families (sequences that share >40% amino-acid identity (ASI) define a family), and 56 subfamilies (sequences that share >60% ASI define a subfamily). Group 1-II of family 1 represents the zone of overlap of sequences derived from using the two primer pairs (*See* FIG. 2).

Non-human primate ORX genes are represented in 6 families and about 45 subfamilies. Numerous sequences are grouped in family 1 (~66%) comprising subfamily 1A, the largest subfamily (57/221, 26%). Subfamily 1B is almost devoid of coding human ORX sequences (FIG. 2). Subfamily 1A contains only human pseudogenes originating from chromosomes 14 and 19 whereas subfamily 1B contains human pseudogenes lying on various chromosomes. As has been previously found for human, the amino-acid sequences deduced from the non-human primate sequences revealed many pseudogenes (FIG. 2 and Table 1).

Table 1 provides information about the evolution of the pseudogene fraction along with the evolution of primates. Hominoids present the highest fraction of pseudogenes (39 to >70%, average ~50%). Old world monkeys (macaque and baboon) have a lower pseudogene fraction

(20 to 35%, average 27%), while even fewer pseudogenes were found among the sequences derived from new world monkeys. Only one pseudogene (SBO64) was identified among the 49 sequences obtained from marmoset and two species of squirrel-monkey. In contrast, 37% of the prosimian lemur ORX sequences were pseudogenes.

TABLE 1

Species		Number of sequences analyzed	% ORF	% pseudogenes	Average % pseudogenes
	Common name				
Hominoids	Human	Homo sapiens (HSA)	99	30	70
	Chimpanzee	Pan troglodytes (PTR)	21	52	48
	Gorilla	Gorilla gorilla (GGO)	18	50	50 %
	Orangutan	Pongo pygmaeus (PPY)	23	61	39
	Gibbon	Hylobates lar (HLA)	22	59	41
	Old world monkeys		Macaca sylvanus (MSY)		
	Macaque	20	65	35	
New world monkeys	Baboon	Papio papio (PPA)	21	81	19
	Marmoset		Callithrix jacchus (CJA)		
Squirrel-monkey		19	100	0	
	Saimiri scireus (SSC)		15	100	0
	Saimiri boliviensis (SBO)		15	93	7

Prosimians	Lemur	Eulemur fulvus (EFU)	19	58	42	
		Eulemur rubriventer (ERU)	16	69	31	37 %
Rodents	Mouse	Mus musculus (MMU)	33	100	0	0 %
Fish	Zebrafish	Danio rerio (DRE)	3	100	0	0 %

Diverse reasons have been suggested that could account for the differences in olfactory ability among mammals, *i.e.*, the size of the anatomical structures devoted to olfaction (olfactory epithelium, olfactory bulb, cortical structures), or the number of ORX families/subfamilies, and the total number and diversity of expressed ORX genes. The olfactory epithelial surface of macrosmatic animals, such as dogs, is larger than in microsmatic humans. On the other hand, using unique dog sequence probes that represent specific ORX subfamilies and which will not cross-hybridize with other subfamilies, comparative analyses have been performed by Southern blot analysis among a panel of mammals including dog and human. The number of ORX sequences per subfamily is similar in microsmatic and macrosmatic animals. A high fraction ($>70\%$) of the human ORX genes have been mutated during evolution into pseudogenes. Chromosomes 7, 16 or 17 contained a high fraction of potentially coding ORX sequences, whereas other chromosomes such as chromosome 3 or 11 contained primarily pseudogenes. Other studies on chromosome 17 and on chromosome 11 in which 75% of the ORX sequences identified were pseudogenes, support these observations.

All ORX sequences derived from mouse are potentially coding. No pseudogenes were detected either by sequencing randomly selected ORX sequences or by deliberately screening with human ORX pseudogene probes. This indicates that the ORX pseudogene content is either zero or restricted to rare examples in mouse.

Thus, the reduction of the sense of smell could correlate with the fraction of functional ORX genes in the genome.

It is difficult to measure and compare the olfactory efficiency of different animal species. Various parameters such as the threshold of detection of odorants (sensitivity), the range of odors detectable and the discriminatory power (acuity) are key parts of the olfactory ability. Thus it is uncertain to determine precisely which of these parameters are taken in account when comparing two species, and therefore the origin of the olfactory deficiency of primates remains a controversial and difficult point to address.

The chromosomal distribution of the ORX gene repertoire arose through multiple duplication rounds giving rise to paralogous regions. Even though the number of duplication events may be different among the mammals, overall it appears that the number of ORX genes was established before the divergence of mammals. *See Ben-Arie et al., (1994) Hum. Mol.*

Genet. 3, 229-35. This explains why, by Southern analysis, there is no striking difference in the number of ORX genes of four different subfamilies between the sea lion, which has an underdeveloped olfactory apparatus, and other mammals. *See id.* On the other hand, the Southern blot approach does not reveal the functionality of the ORX sequences, and we predict
5 that a large fraction of the sea lion ORX genes could be pseudogenes as has been described for the dolphin. *See* Sharon et al., (1999) *Genomics*, 61, 24-36. Similarly striking differences have been observed in the olfactory ability of different breeds of dogs. *See* Issel-Tarver et al., (1996)
10 *Proc. Natl. Acad. Sci. USA* 93, 10897-902. Despite the variations in the size of the olfactory epithelium of the different breeds, it would be interesting to know what the biological basis is for
15 the differences in performances observed between sight and scent hounds. One obvious possibility is loss of functional ORX genes, but, given the recent origin of all modern dogs this explanation seems unlikely. Other explanations could be changes in behavior, or in expression brought about by the modification of a key master transcription factor or in the unusual mechanism that allows only one ORX gene allele or the other to be expressed exclusively in any one epithelium cell.

ORX Nucleic Acids

The nucleic acids of the invention include those that encode an ORX polypeptide or protein. As used herein, the terms polypeptide and protein are interchangeable.

20 In some embodiments, an ORX nucleic acid encodes a mature ORX polypeptide. As used herein, a "mature" form of a polypeptide or protein described herein relates to the product of a naturally occurring polypeptide or precursor form or proprotein. The naturally occurring polypeptide, precursor or proprotein includes, by way of nonlimiting example, the full-length gene product, encoded by the corresponding gene. Alternatively, it may be defined as the
25 polypeptide, precursor or proprotein encoded by an open reading frame described herein. The product "mature" form arises, again by way of nonlimiting example, as a result of one or more naturally occurring processing steps that may take place within the cell in which the gene product arises. Examples of such processing steps leading to a "mature" form of a polypeptide or protein include the cleavage of the N-terminal methionine residue encoded by the initiation codon of an
30 open reading frame, or the proteolytic cleavage of a signal peptide or leader sequence. Thus a

mature form arising from a precursor polypeptide or protein that has residues 1 to N, where residue 1 is the N-terminal methionine, would have residues 2 through N remaining after removal of the N-terminal methionine. Alternatively, a mature form arising from a precursor polypeptide or protein having residues 1 to N, in which an N-terminal signal sequence from residue 1 to residue M is cleaved, would have the residues from residue M+1 to residue N remaining. Further as used herein, a “mature” form of a polypeptide or protein may arise from a step of post-translational modification other than a proteolytic cleavage event. Such additional processes include, by way of non-limiting example, glycosylation, myristylation or phosphorylation. In general, a mature polypeptide or protein may result from the operation of only one of these processes, or a combination of any of them.

Among the ORX nucleic acids is the nucleic acid whose sequence is provided by GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof. Additionally, the invention includes mutant or variant nucleic acids of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof, any of whose bases may be changed from the corresponding bases shown in the ORX nucleic acids, while still encoding a protein that maintains at least one of its ORX-like activities and physiological functions (*i.e.*, modulating angiogenesis, neuronal development). The invention further includes the complement of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, including fragments, derivatives, analogs and homologs thereof. The invention additionally includes nucleic acids or nucleic acid fragments, or complements thereto, whose structures include chemical modifications.

One aspect of the invention pertains to isolated nucleic acid molecules that encode ORX proteins or biologically active portions thereof. Also included are nucleic acid fragments sufficient for use as hybridization probes to identify ORX-encoding nucleic acids (*e.g.*, ORX mRNA) and fragments for use as polymerase chain reaction (PCR) primers for the amplification or mutation of ORX nucleic acid molecules. As used herein, the term “nucleic acid molecule” is intended to include DNA molecules (*e.g.*, cDNA or genomic DNA), RNA molecules (*e.g.*, mRNA), analogs of the DNA or RNA generated using nucleotide analogs, and derivatives,

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fragments and homologs thereof. The nucleic acid molecule can be single-stranded or double-stranded, but preferably is double-stranded DNA.

“Probes” refer to nucleic acid sequences of variable length, preferably between at least about 10 nucleotides (nt), 100 nt, or as many as about, *e.g.*, 6,000 nt, depending on use. Probes 5 are used in the detection of identical, similar, or complementary nucleic acid sequences. Longer length probes are usually obtained from a natural or recombinant source, are highly specific and much slower to hybridize than oligomers. Probes may be single- or double-stranded and designed to have specificity in PCR, membrane-based hybridization technologies, or ELISA-like technologies.

10 An “isolated” nucleic acid molecule is one that is separated from other nucleic acid molecules that are present in the natural source of the nucleic acid. Examples of isolated nucleic acid molecules include, but are not limited to, recombinant DNA molecules contained in a vector, recombinant DNA molecules maintained in a heterologous host cell, partially or substantially purified nucleic acid molecules, and synthetic DNA or RNA molecules. Preferably, 15 an “isolated” nucleic acid is free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated ORX nucleic acid molecule can contain less than about 50 kb, 25 kb, 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of nucleotide sequences which naturally flank the nucleic acid molecule in genomic 20 DNA of the cell from which the nucleic acid is derived. Moreover, an “isolated” nucleic acid molecule, such as a cDNA molecule, can be substantially free of other cellular material or culture medium when produced by recombinant techniques, or of chemical precursors or other chemicals when chemically synthesized.

A nucleic acid molecule of the present invention, *e.g.*, a nucleic acid molecule having the 25 nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a complement of any of these nucleotide sequences, can be isolated using standard molecular biology techniques and the sequence information provided herein. Using all or a portion of the nucleic acid sequence of GenBank 30 Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, as a hybridization probe, ORX nucleic acid sequences can be isolated using standard

hybridization and cloning techniques (e.g., as described in Sambrook *et al.*, eds., MOLECULAR CLONING: A LABORATORY MANUAL 2nd Ed., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989; and Ausubel, *et al.*, eds., CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993.)

5 A nucleic acid of the invention can be amplified using cDNA, mRNA or alternatively, genomic DNA, as a template and appropriate oligonucleotide primers according to standard PCR amplification techniques. The nucleic acid so amplified can be cloned into an appropriate vector and characterized by DNA sequence analysis. Furthermore, oligonucleotides corresponding to ORX nucleotide sequences can be prepared by standard synthetic techniques, e.g., using an
10 automated DNA synthesizer.

As used herein, the term "oligonucleotide" refers to a series of linked nucleotide residues, which oligonucleotide has a sufficient number of nucleotide bases to be used in a PCR reaction. A short oligonucleotide sequence may be based on, or designed from, a genomic or cDNA sequence and is used to amplify, confirm, or reveal the presence of an identical, similar or complementary DNA or RNA in a particular cell or tissue. Oligonucleotides comprise portions of a nucleic acid sequence having about 10 nt, 50 nt, or 100 nt in length, preferably about 15 nt to 30 nt in length. In one embodiment, an oligonucleotide comprising a nucleic acid molecule less than 100 nt in length would further comprise at least 6 contiguous nucleotides of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
15 or a complement thereof. Oligonucleotides may be chemically synthesized and may be used as probes.
20

In another embodiment, an isolated nucleic acid molecule of the invention comprises a nucleic acid molecule that is a complement of the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
25 or a portion of this nucleotide sequence. A nucleic acid molecule that is complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 is one that is sufficiently complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 that it can hydrogen bond with little or no

mismatches to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, thereby forming a stable duplex.

As used herein, the term "complementary" refers to Watson-Crick or Hoogsteen base pairing between nucleotide units of a nucleic acid molecule, and the term "binding" means the physical or chemical interaction between two polypeptides or compounds or associated polypeptides or compounds or combinations thereof. Binding includes ionic, non-ionic, Von der Waals, hydrophobic interactions, etc. A physical interaction can be either direct or indirect. Indirect interactions may be through or due to the effects of another polypeptide or compound. Direct binding refers to interactions that do not take place through, or due to, the effect of another polypeptide or compound, but instead are without other substantial chemical intermediates.

Moreover, the nucleic acid molecule of the invention can comprise only a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, e.g., a fragment that can be used as a probe or primer, or a fragment encoding a biologically active portion of ORX. Fragments provided herein are defined as sequences of at least 6 (contiguous) nucleic acids or at least 4 (contiguous) amino acids, a length sufficient to allow for specific hybridization in the case of nucleic acids or for specific recognition of an epitope in the case of amino acids, respectively, and are at most some portion less than a full length sequence. Fragments may be derived from any contiguous portion of a nucleic acid or amino acid sequence of choice. Derivatives are nucleic acid sequences or amino acid sequences formed from the native compounds either directly or by modification or partial substitution. Analogs are nucleic acid sequences or amino acid sequences that have a structure similar to, but not identical to, the native compound but differs from it in respect to certain components or side chains. Analogs may be synthetic or from a different evolutionary origin and may have a similar or opposite metabolic activity compared to wild type.

Derivatives and analogs may be full length or other than full length, if the derivative or analog contains a modified nucleic acid or amino acid, as described below. Derivatives or analogs of the nucleic acids or proteins of the invention include, but are not limited to, molecules comprising regions that are substantially homologous to the nucleic acids or proteins of the invention, in various embodiments, by at least about 70%, 80%, 85%, 90%, 95%, 98%, or even 99% identity (with a preferred identity of 80-99%) over a nucleic acid or amino acid sequence of

identical size or when compared to an aligned sequence in which the alignment is done by a computer homology program known in the art, or whose encoding nucleic acid is capable of hybridizing to the complement of a sequence encoding the aforementioned proteins under stringent, moderately stringent, or low stringent conditions. See e.g. Ausubel, *et al.*, CURRENT
5 PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993, and below. An exemplary program is the Gap program (Wisconsin Sequence Analysis Package, Version 8 for UNIX, Genetics Computer Group, University Research Park, Madison, WI) using the default settings, which uses the algorithm of Smith and Waterman (Adv. Appl. Math., 1981, 2: 482-489, which is incorporated herein by reference in its entirety).

10 A "homologous nucleic acid sequence" or "homologous amino acid sequence," or variations thereof, refer to sequences characterized by a homology at the nucleotide level or amino acid level as discussed above. Homologous nucleotide sequences encode those sequences coding for isoforms of an ORX polypeptide. Isoforms can be expressed in different tissues of the same organism as a result of, for example, alternative splicing of RNA. Alternatively, isoforms
15 can be encoded by different genes. In the present invention, homologous nucleotide sequences include nucleotide sequences encoding for an ORX polypeptide of species other than humans, including, but not limited to, mammals, and thus can include, e.g., mouse, rat, rabbit, dog, cat cow, horse, and other organisms. Homologous nucleotide sequences also include, but are not limited to, naturally occurring allelic variations and mutations of the nucleotide sequences set forth herein. A homologous nucleotide sequence does not, however, include the nucleotide sequence encoding human ORX protein. Homologous nucleic acid sequences include those nucleic acid sequences that encode conservative amino acid substitutions (see below) in the amino acid sequence of an ORX polypeptide, as well as a polypeptide having ORX activity.
20 Biological activities of the ORX proteins are described below. A homologous amino acid sequence does not encode the amino acid sequence of a human ORX polypeptide.
25

The nucleotide sequence determined from the cloning of the human ORX gene allows for the generation of probes and primers designed for use in identifying and/or cloning ORX homologues in other cell types, e.g., from other tissues, as well as ORX homologues from other mammals. The probe/primer typically comprises a substantially purified oligonucleotide. The
30 oligonucleotide typically comprises a region of nucleotide sequence that hybridizes under

stringent conditions to at least about 12, 25, 50, 100, 150, 200, 250, 300, 350 or 400 or more consecutive sense strand nucleotide sequences of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or an anti-sense strand nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, 5 AF127814-127907, and AF179716-179843; or of a naturally occurring mutant of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Probes based on the human ORX nucleotide sequence can be used to detect transcripts or genomic sequences encoding the same or homologous proteins. In various embodiments, the probe further comprises a label group attached thereto, *e.g.*, the label group can be a radioisotope, 10 a fluorescent compound, an enzyme, or an enzyme co-factor. Such probes can be used as a part of a diagnostic test kit for identifying cells or tissue which misexpress an ORX protein, such as by measuring a level of an ORX-encoding nucleic acid in a sample of cells from a subject *e.g.*, detecting ORX mRNA levels or determining whether a genomic ORX gene has been mutated or deleted.

A "polypeptide having a biologically active portion of ORX" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. A nucleic acid fragment encoding a "biologically active portion of ORX" can be prepared by isolating a portion of an ORX nucleic acid that encodes a polypeptide 15 having an ORX biological activity (biological activities of the ORX proteins are described below), expressing the encoded portion of ORX protein (*e.g.*, by recombinant expression *in vitro*) and assessing the activity of the encoded portion of ORX. For example, a nucleic acid fragment encoding a biologically active portion of ORX can optionally include an ATP-binding domain. In another embodiment, a nucleic acid fragment encoding a biologically active portion 20 of ORX includes one or more regions.

ORX Variants

The invention further encompasses nucleic acid molecules that differ from the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-30 127907, and AF179716-179843 due to the degeneracy of the genetic code. These nucleic acid

molecules thus encode the same ORX protein as that encoded by the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 *e.g.*, the ORX polypeptides.

In addition to the human ORX nucleic acids, it will be appreciated by those skilled in the art that DNA sequence polymorphisms that lead to changes in the amino acid sequences of ORX may exist within a population (*e.g.*, the human population). Such genetic polymorphism in the ORX gene may exist among individuals within a population due to natural allelic variation. As used herein, the terms "gene" and "recombinant gene" refer to nucleic acid molecules comprising an open reading frame encoding an ORX protein, preferably a mammalian ORX protein. Such natural allelic variations can typically result in 1-5% variance in the nucleotide sequence of the ORX gene. Any and all such nucleotide variations and resulting amino acid polymorphisms in ORX that are the result of natural allelic variation and that do not alter the functional activity of ORX are intended to be within the scope of the invention.

Moreover, nucleic acid molecules encoding ORX proteins from other species, and thus that have a nucleotide sequence that differs from the human sequence of the ORX nucleic acid molecules are intended to be within the scope of the invention. Nucleic acid molecules corresponding to natural allelic variants and homologues of the ORX cDNAs of the invention can be isolated based on their homology to the human ORX nucleic acids disclosed herein using the human cDNAs, or a portion thereof, as a hybridization probe according to standard hybridization techniques under stringent hybridization conditions. For example, a soluble human ORX cDNA can be isolated based on its homology to human membrane-bound ORX. Likewise, a membrane-bound human ORX cDNA can be isolated based on its homology to soluble human ORX.

Accordingly, in another embodiment, an isolated nucleic acid molecule of the invention is at least 6 nucleotides in length and hybridizes under stringent conditions to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. In another embodiment, the nucleic acid is at least 10, 25, 50, 100, 250, 500 or 750 nucleotides in length. In another embodiment, an isolated nucleic acid molecule of the invention hybridizes to the coding region.

As used herein, the term "hybridizes under stringent conditions" is intended to describe

conditions for hybridization and washing under which nucleotide sequences at least 60% homologous to each other typically remain hybridized to each other.

Homologs (*i.e.*, nucleic acids encoding ORX proteins derived from species other than human) or other related sequences (*e.g.*, paralogs) can be obtained by low, moderate or high 5 stringency hybridization with all or a portion of the particular human sequence as a probe using methods well known in the art for nucleic acid hybridization and cloning.

As used herein, the phrase “stringent hybridization conditions” refers to conditions under which a probe, primer or oligonucleotide will hybridize to its target sequence, but to no other sequences. Stringent conditions are sequence-dependent and will be different in different 10 circumstances. Longer sequences hybridize specifically at higher temperatures than shorter sequences. Generally, stringent conditions are selected to be about 5 °C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength and pH. The T_m is the temperature (under defined ionic strength, pH and nucleic acid concentration) at which 50% of the probes complementary to the target sequence hybridize to the target sequence at equilibrium. Since the target sequences are generally present at excess, at T_m , 50% of the probes are occupied 15 at equilibrium. Typically, stringent conditions will be those in which the salt concentration is less than about 1.0 M sodium ion, typically about 0.01 to 1.0 M sodium ion (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30 °C for short probes, primers or oligonucleotides (*e.g.*, 10 nt to 50 nt) and at least about 60°C for longer probes, primers and 20 oligonucleotides. Stringent conditions may also be achieved with the addition of destabilizing agents, such as formamide.

Stringent conditions are known to those skilled in the art and can be found in CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, N.Y. (1989), 6.3.1-6.3.6. Preferably, the conditions are such that sequences at least about 65%, 70%, 75%, 85%, 90%, 95%, 98%, or 25 99% homologous to each other typically remain hybridized to each other. A non-limiting example of stringent hybridization conditions is hybridization in a high salt buffer comprising 6X SSC, 50 mM Tris-HCl (pH 7.5), 1 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.02% BSA, and 500 mg/ml denatured salmon sperm DNA at 65 °C. This hybridization is followed by one or more washes in 0.2X SSC, 0.01% BSA at 50 °C. An isolated nucleic acid molecule of the invention 30 that hybridizes under stringent conditions to the sequence of GenBank Accession Numbers

AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 corresponds to a naturally occurring nucleic acid molecule. As used herein, a "naturally-occurring" nucleic acid molecule refers to an RNA or DNA molecule having a nucleotide sequence that occurs in nature (e.g., encodes a natural protein).

5 In a second embodiment, a nucleic acid sequence that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of moderate stringency is provided. A non-limiting example of moderate stringency hybridization conditions are hybridization in 6X SSC, 5X
10 Denhardt's solution, 0.5% SDS and 100 mg/ml denatured salmon sperm DNA at 55°C, followed by one or more washes in 1X SSC, 0.1% SDS at 37 °C. Other conditions of moderate stringency that may be used are well known in the art. See, e.g., Ausubel *et al.* (eds.), 1993, CURRENT
PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE
TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY.

15 In a third embodiment, a nucleic acid that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of low stringency, is provided. A non-limiting example of low stringency hybridization conditions are hybridization in 35% formamide, 5X SSC, 50 mM

20 Tris-HCl (pH 7.5), 5 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.2% BSA, 100 mg/ml denatured salmon sperm DNA, 10% (wt/vol) dextran sulfate at 40 °C, followed by one or more washes in 2X SSC, 25 mM Tris-HCl (pH 7.4), 5 mM EDTA, and 0.1% SDS at 50 °C. Other conditions of low stringency that may be used are well known in the art (e.g., as employed for cross-species hybridizations). See, e.g., Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR
25 BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY; Shilo and Weinberg, 1981, *Proc Natl Acad Sci USA* 78: 6789-6792.

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Conservative mutations

In addition to naturally-occurring allelic variants of the ORX sequence that may exist in the population, the skilled artisan will further appreciate that changes can be introduced by mutation into the nucleotide sequence of the ORX nucleic acid molecules, thereby leading to changes in the amino acid sequence of the encoded ORX protein, without altering the functional ability of the ORX protein. For example, nucleotide substitutions leading to amino acid substitutions at "non-essential" amino acid residues can be made in the sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. A "non-essential" amino acid residue is a residue that can be altered from the wild-type sequence of ORX without altering the biological activity, whereas an "essential" amino acid residue is required for biological activity. For example, amino acid residues that are conserved among the ORX proteins of the present invention, are predicted to be particularly unamenable to alteration.

Another aspect of the invention pertains to nucleic acid molecules encoding ORX proteins that contain changes in amino acid residues that are not essential for activity. Such ORX proteins differ in amino acid sequence from the ORX polypeptides, yet retain biological activity. In one embodiment, the isolated nucleic acid molecule comprises a nucleotide sequence encoding a protein, wherein the protein comprises an amino acid sequence at least about 75% homologous to the amino acid sequence of the ORX polypeptides. Preferably, the protein encoded by the nucleic acid is at least about 80% homologous to the sequence of an ORX polypeptide, more preferably at least about 90%, 95%, 98%, and most preferably at least about 99% homologous to the sequence of an ORX polypeptide.

An isolated nucleic acid molecule encoding an ORX protein homologous to the protein of can be created by introducing one or more nucleotide substitutions, additions or deletions into the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, such that one or more amino acid substitutions, additions or deletions are introduced into the encoded protein.

Mutations can be introduced into the nucleotide sequence of the ORX nucleic acid molecules by standard techniques, such as site-directed mutagenesis and PCR-mediated mutagenesis. Preferably, conservative amino acid substitutions are made at one or more predicted non-essential amino acid residues. A "conservative amino acid substitution" is one in

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which the amino acid residue is replaced with an amino acid residue having a similar side chain. Families of amino acid residues having similar side chains have been defined in the art. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, 5 glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine, tryptophan, histidine). Thus, a predicted nonessential amino acid residue in ORX is replaced with another amino acid residue from the same side chain family. Alternatively, in another 10 embodiment, mutations can be introduced randomly along all or part of an ORX coding sequence, such as by saturation mutagenesis, and the resultant mutants can be screened for ORX biological activity to identify mutants that retain activity. Following mutagenesis of the ORX nucleic acid molecule, the encoded protein can be expressed by any recombinant technology known in the art and the activity of the protein can be determined.

15 In one embodiment, a mutant ORX protein can be assayed for (1) the ability to form protein:protein interactions with other ORX proteins, other cell-surface proteins, or biologically active portions thereof, (2) complex formation between a mutant ORX protein and an ORX receptor; (3) the ability of a mutant ORX protein to bind to an intracellular target protein or biologically active portion thereof; (*e.g.*, avidin proteins); (4) the ability to bind ORX protein; or 20 (5) the ability to specifically bind an anti-ORX protein antibody.

Antisense ORX Nucleic Acids

Another aspect of the invention pertains to isolated antisense nucleic acid molecules that are hybridizable to or complementary to the nucleic acid molecule comprising the nucleotide 25 sequence of the ORX nucleic acid molecule, or fragments, analogs or derivatives thereof. An "antisense" nucleic acid comprises a nucleotide sequence that is complementary to a "sense" nucleic acid encoding a protein, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. In specific aspects, antisense nucleic acid molecules are provided that comprise a sequence complementary to at least about 10, 25, 50, 30 100, 250 or 500 nucleotides or an entire ORX coding strand, or to only a portion thereof.

Nucleic acid molecules encoding fragments, homologs, derivatives and analogs of an ORX protein or antisense nucleic acids complementary to an ORX nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 are additionally provided.

5 In one embodiment, an antisense nucleic acid molecule is antisense to a "coding region" of the coding strand of a nucleotide sequence encoding ORX. The term "coding region" refers to the region of the nucleotide sequence comprising codons which are translated into amino acid residues. In another embodiment, the antisense nucleic acid molecule is antisense to a "noncoding region" of the coding strand of a nucleotide sequence encoding ORX. The term "noncoding region" refers to 5' and 3' sequences which flank the coding region that are not 10 translated into amino acids (*i.e.*, also referred to as 5' and 3' untranslated regions).

Given the coding strand sequences encoding ORX disclosed herein, antisense nucleic acids of the invention can be designed according to the rules of Watson and Crick or Hoogsteen base pairing. The antisense nucleic acid molecule can be complementary to the entire coding region of ORX mRNA, but more preferably is an oligonucleotide that is antisense to only a portion of the coding or noncoding region of ORX mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the translation start site of ORX mRNA. An antisense oligonucleotide can be, for example, about 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 nucleotides in length. An antisense nucleic acid of the invention can be constructed using 15 chemical synthesis or enzymatic ligation reactions using procedures known in the art. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and 20 acridine substituted nucleotides can be used.

25 Examples of modified nucleotides that can be used to generate the antisense nucleic acid include: 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xanthine, 4-acetylcytosine, 5-(carboxyhydroxymethyl) uracil, 5-carboxymethylaminomethyl- 30 2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine, inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine,

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2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5'-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, 5 queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine. Alternatively, the antisense nucleic acid can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the 10 inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

The antisense nucleic acid molecules of the invention are typically administered to a subject or generated *in situ* such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding an ORX protein to thereby inhibit expression of the protein, *e.g.*, by inhibiting transcription and/or translation. The hybridization can be by conventional nucleotide complementarity to form a stable duplex, or, for example, in the case of an antisense nucleic acid molecule that binds to DNA duplexes, through specific interactions in the major groove of the double helix. An example of a route of administration of antisense nucleic acid molecules of the invention includes direct injection at a tissue site. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then administered systemically. For example, for systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, *e.g.*, by linking the antisense nucleic acid molecules to peptides or antibodies that bind to cell surface receptors or antigens. The antisense nucleic acid molecules can also be delivered to cells using the vectors described herein. 20 To achieve sufficient intracellular concentrations of antisense molecules, vector constructs in which the antisense nucleic acid molecule is placed under the control of a strong pol II or pol III promoter are preferred.

In yet another embodiment, the antisense nucleic acid molecule of the invention is an α -anomeric nucleic acid molecule. An α -anomeric nucleic acid molecule forms specific 30 double-stranded hybrids with complementary RNA in which, contrary to the usual β -units, the

strands run parallel to each other (Gaultier *et al.* (1987) *Nucleic Acids Res* 15: 6625-6641). The antisense nucleic acid molecule can also comprise a 2'-o-methylribonucleotide (Inoue *et al.* (1987) *Nucleic Acids Res* 15: 6131-6148) or a chimeric RNA -DNA analogue (Inoue *et al.* (1987) *FEBS Lett* 215: 327-330).

5 Such modifications include, by way of nonlimiting example, modified bases, and nucleic acids whose sugar phosphate backbones are modified or derivatized. These modifications are carried out at least in part to enhance the chemical stability of the modified nucleic acid, such that they may be used, for example, as antisense binding nucleic acids in therapeutic applications in a subject.

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ORX Ribozymes and PNA moieties

In still another embodiment, an antisense nucleic acid of the invention is a ribozyme. Ribozymes are catalytic RNA molecules with ribonuclease activity that are capable of cleaving a single-stranded nucleic acid, such as a mRNA, to which they have a complementary region. Thus, ribozymes (*e.g.*, hammerhead ribozymes (described in Haselhoff and Gerlach (1988) *Nature* 334:585-591)) can be used to catalytically cleave ORX mRNA transcripts to thereby inhibit translation of ORX mRNA. A ribozyme having specificity for an ORX-encoding nucleic acid can be designed based upon the nucleotide sequence of an ORX DNA disclosed herein. For example, a derivative of a Tetrahymena L-19 IVS RNA can be constructed in which the 20 nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in an ORX-encoding mRNA. See, *e.g.*, Cech *et al.* U.S. Pat. No. 4,987,071; and Cech *et al.* U.S. Pat. No. 5,116,742. Alternatively, ORX mRNA can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules. See, *e.g.*, Bartel *et al.*, (1993) *Science* 261:1411-1418.

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Alternatively, ORX gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of the ORX (*e.g.*, the ORX promoter and/or enhancers) to form triple helical structures that prevent transcription of the ORX gene in target cells. See generally, Helene. (1991) *Anticancer Drug Des.* 6: 569-84; Helene. *et al.* (1992) *Ann. N.Y. Acad. Sci.* 660:27-36; and Maher (1992) *Bioassays* 14: 807-15.

In various embodiments, the nucleic acids of ORX can be modified at the base moiety, sugar moiety or phosphate backbone to improve, e.g., the stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of the nucleic acids can be modified to generate peptide nucleic acids (see Hyrup *et al.* (1996) *Bioorg Med Chem* 4: 5-23).

5 As used herein, the terms "peptide nucleic acids" or "PNAs" refer to nucleic acid mimics, e.g., DNA mimics, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of PNAs has been shown to allow for specific hybridization to DNA and RNA under conditions of low ionic strength. The synthesis of PNA oligomers can be performed using standard solid phase peptide

10 synthesis protocols as described in Hyrup *et al.* (1996) above; Perry-O'Keefe *et al.* (1996) *PNAS* 93: 14670-675.

PNAs of ORX can be used in therapeutic and diagnostic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, e.g., inducing transcription or translation arrest or inhibiting replication. PNAs of ORX can also be used, e.g., in the analysis of single base pair mutations in a gene by, e.g., PNA directed PCR clamping; as artificial restriction enzymes when used in combination with other enzymes, e.g., S1 nucleases (Hyrup B. (1996) above); or as probes or primers for DNA sequence and hybridization (Hyrup *et al.* (1996), above; Perry-O'Keefe (1996), above).

In another embodiment, PNAs of ORX can be modified, e.g., to enhance their stability or cellular uptake, by attaching lipophilic or other helper groups to PNA, by the formation of PNA-DNA chimeras, or by the use of liposomes or other techniques of drug delivery known in the art. For example, PNA-DNA chimeras of ORX can be generated that may combine the advantageous properties of PNA and DNA. Such chimeras allow DNA recognition enzymes, e.g., RNase H and DNA polymerases, to interact with the DNA portion while the PNA portion would provide high binding affinity and specificity. PNA-DNA chimeras can be linked using linkers of appropriate lengths selected in terms of base stacking, number of bonds between the nucleobases, and orientation (Hyrup (1996) above). The synthesis of PNA-DNA chimeras can be performed as described in Hyrup (1996) above and Finn *et al.* (1996) *Nucl Acids Res* 24: 3357-63. For example, a DNA chain can be synthesized on a solid support using standard phosphoramidite coupling chemistry, and modified nucleoside analogs, e.g., 5'-(4-methoxytrityl)

amino-5'-deoxy-thymidine phosphoramidite, can be used between the PNA and the 5' end of DNA (Mag *et al.* (1989) *Nucl Acid Res* 17: 5973-88). PNA monomers are then coupled in a stepwise manner to produce a chimeric molecule with a 5' PNA segment and a 3' DNA segment (Finn *et al.* (1996) above). Alternatively, chimeric molecules can be synthesized with a 5' DNA segment and a 3' PNA segment. See, Petersen *et al.* (1975) *Bioorg Med Chem Lett* 5: 1119-1124.

In other embodiments, the oligonucleotide may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, 1989, *Proc. Natl. Acad. Sci. U.S.A.* 86:6553-6556; Lemaitre *et al.*, 1987, *Proc. Natl. Acad. Sci.* 84:648-652; PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W089/10134). In addition, oligonucleotides can be modified with hybridization triggered cleavage agents (See, *e.g.*, Krol *et al.*, 1988, *BioTechniques* 6:958-976) or intercalating agents. (See, *e.g.*, Zon, 1988, *Pharm. Res.* 5: 539-549). To this end, the oligonucleotide may be conjugated to another molecule, *e.g.*, a peptide, a hybridization triggered cross-linking agent, a transport agent, a hybridization-triggered cleavage agent, etc.

ORX Polypeptides

An ORX polypeptide of the invention includes the ORX-like protein whose sequence is provided in GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989. The invention also includes a mutant or variant protein any of whose residues may be changed from the corresponding residue of the ORX polypeptide while still encoding a protein that maintains its ORX-like activities and

physiological functions, or a functional fragment thereof. In some embodiments, up to 20% or more of the residues may be so changed in the mutant or variant protein. In some embodiments, the ORX polypeptide according to the invention is a mature polypeptide.

In general, an ORX -like variant that preserves ORX-like function includes any variant in which residues at a particular position in the sequence have been substituted by other amino acids, and further include the possibility of inserting an additional residue or residues between two residues of the parent protein as well as the possibility of deleting one or more residues from the parent sequence. Any amino acid substitution, insertion, or deletion is encompassed by the invention. In favorable circumstances, the substitution is a conservative substitution as defined above.

One aspect of the invention pertains to isolated ORX proteins, and biologically active portions thereof, or derivatives, fragments, analogs or homologs thereof. Also provided are polypeptide fragments suitable for use as immunogens to raise anti-ORX antibodies. In one embodiment, native ORX proteins can be isolated from cells or tissue sources by an appropriate purification scheme using standard protein purification techniques. In another embodiment, ORX proteins are produced by recombinant DNA techniques. Alternative to recombinant expression, an ORX protein or polypeptide can be synthesized chemically using standard peptide synthesis techniques.

An "isolated" or "purified" protein or biologically active portion thereof is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the ORX protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. The language "substantially free of cellular material" includes preparations of ORX protein in which the protein is separated from cellular components of the cells from which it is isolated or recombinantly produced. In one embodiment, the language "substantially free of cellular material" includes preparations of ORX protein having less than about 30% (by dry weight) of non-ORX protein (also referred to herein as a "contaminating protein"), more preferably less than about 20% of non-ORX protein, still more preferably less than about 10% of non-ORX protein, and most preferably less than about 5% non-ORX protein. When the ORX protein or biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, *i.e.*, culture medium represents less than about

20%, more preferably less than about 10%, and most preferably less than about 5% of the volume of the protein preparation.

The language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein in which the protein is separated from chemical precursors or other chemicals that are involved in the synthesis of the protein. In one embodiment, the language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein having less than about 30% (by dry weight) of chemical precursors or non-ORX chemicals, more preferably less than about 20% chemical precursors or non-ORX chemicals, still more preferably less than about 10% chemical precursors or non-ORX chemicals, and most preferably less than about 5% chemical precursors or non-ORX chemicals.

Biologically active portions of an ORX protein include peptides comprising amino acid sequences sufficiently homologous to or derived from the amino acid sequence of the ORX protein, *e.g.*, the amino acid sequence of the ORX polypeptides that include fewer amino acids than the full length ORX proteins, and exhibit at least one activity of an ORX protein. Typically, biologically active portions comprise a domain or motif with at least one activity of the ORX protein. A biologically active portion of an ORX protein can be a polypeptide which is, for example, 10, 25, 50, 100 or more amino acids in length.

In some embodiments, an ORX protein of the invention includes the amino acid sequence of the herein described polypeptide and a number of amino acids on the amino terminus of the ORX protein, the carboxy terminus if the ORX protein, or a number of amino acids on both termni of the disclosed ORX protein. Thus, the ORX protein can include 1, 2, 3, 4, 5, 10, 15, 20, 25, 50, or 75 or more amino acids on the amino terminus, the carboxy terminus, or both termini of the disclosed amino acid sequence.

A biologically active portion of an ORX protein of the present invention may contain at least one of the above-identified domains conserved between the ORX proteins, *e.g.* TSR modules. Moreover, other biologically active portions, in which other regions of the protein are deleted, can be prepared by recombinant techniques and evaluated for one or more of the functional activities of a native ORX protein.

In an embodiment, the ORX protein has an amino acid sequence of an ORX polypeptides.

30 In other embodiments, the ORX protein is substantially homologous to an ORX polypeptide and

retains the functional activity of the ORX polypeptide yet differs in amino acid sequence due to natural allelic variation or mutagenesis, as described in detail below. Accordingly, in another embodiment, the ORX protein is a protein that comprises an amino acid sequence at least about 45% homologous to the amino acid sequence of an ORX polypeptide and retains the functional

5 activity of the ORX polypeptides.

Determining homology between two or more sequence

To determine the percent homology of two amino acid sequences or of two nucleic acids, the sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in either 10 of the sequences being compared for optimal alignment between the sequences). The amino acid residues or nucleotides at corresponding amino acid positions or nucleotide positions are then compared. When a position in the first sequence is occupied by the same amino acid residue or nucleotide as the corresponding position in the second sequence, then the molecules are homologous at that position (*i.e.*, as used herein amino acid or nucleic acid "homology" is equivalent to amino acid or nucleic acid "identity").

The nucleic acid sequence homology may be determined as the degree of identity between two sequences. The homology may be determined using computer programs known in the art, such as GAP software provided in the GCG program package. See, *Needleman and Wunsch* 1970 *J Mol Biol* 48: 443-453. Using GCG GAP software with the following settings for 15 nucleic acid sequence comparison: GAP creation penalty of 5.0 and GAP extension penalty of 0.3, the coding region of the analogous nucleic acid sequences referred to above exhibits a degree of identity preferably of at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99%, with the CDS (encoding) part of the DNA sequence shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

20 The term "sequence identity" refers to the degree to which two polynucleotide or polypeptide sequences are identical on a residue-by-residue basis over a particular region of comparison. The term "percentage of sequence identity" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions 25 at which the identical nucleic acid base (*e.g.*, A, T, C, G, U, or I, in the case of nucleic acids) occurs in both sequences to yield the number of matched positions, dividing the number of

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matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of sequence identity. The term "substantial identity" as used herein denotes a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 80 percent sequence identity, 5 preferably at least 85 percent identity and often 90 to 95 percent sequence identity, more usually at least 99 percent sequence identity as compared to a reference sequence over a comparison region. The term "percentage of positive residues" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical and conservative amino acid substitutions, as defined above, occur in both 10 sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of positive residues.

Chimeric and fusion proteins

The invention also provides ORX chimeric or fusion proteins. As used herein, an ORX "chimeric protein" or "fusion protein" comprises an ORX polypeptide operatively linked to a non-ORX polypeptide. An "ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to ORX, whereas a "non-ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to a protein that is not substantially homologous to the ORX protein, *e.g.*, a protein that is different from the ORX protein and that is derived from the same or a different organism. Within an ORX fusion protein the ORX polypeptide can correspond to all or a portion of an ORX protein. In one embodiment, an ORX fusion protein comprises at least one biologically active portion of an ORX protein. In another embodiment, an ORX fusion protein comprises at least two biologically active portions of an ORX protein. 15 20 25 Within the fusion protein, the term "operatively linked" is intended to indicate that the ORX polypeptide and the non-ORX polypeptide are fused in-frame to each other. The non-ORX polypeptide can be fused to the N-terminus or C-terminus of the ORX polypeptide.

For example, in one embodiment an ORX fusion protein comprises an ORX polypeptide operably linked to the extracellular domain of a second protein. Such fusion proteins can be

further utilized in screening assays for compounds that modulate ORX activity (such assays are described in detail below).

In another embodiment, the fusion protein is a GST-ORX fusion protein in which the ORX sequences are fused to the C-terminus of the GST (*i.e.*, glutathione S-transferase) sequences. Such fusion proteins can facilitate the purification of recombinant ORX.

In another embodiment, the fusion protein is an ORX-immunoglobulin fusion protein in which the ORX sequences comprising one or more domains are fused to sequences derived from a member of the immunoglobulin protein family. The ORX-immunoglobulin fusion proteins of the invention can be incorporated into pharmaceutical compositions and administered to a subject to inhibit an interaction between an ORX ligand and an ORX protein on the surface of a cell, to thereby suppress ORX-mediated signal transduction *in vivo*. In one nonlimiting example, a contemplated ORX ligand of the invention is the ORX receptor. The ORX-immunoglobulin fusion proteins can be used to affect the bioavailability of an ORX cognate ligand. Inhibition of the ORX ligand/ORX interaction may be useful therapeutically for both the treatment of proliferative and differentiative disorders, *e.g.*, cancer as well as modulating (*e.g.*, promoting or inhibiting) cell survival. Moreover, the ORX-immunoglobulin fusion proteins of the invention can be used as immunogens to produce anti-ORX antibodies in a subject, to purify ORX ligands, and in screening assays to identify molecules that inhibit the interaction of ORX with an ORX ligand.

An ORX chimeric or fusion protein of the invention can be produced by standard recombinant DNA techniques. For example, DNA fragments coding for the different polypeptide sequences are ligated together in-frame in accordance with conventional techniques, *e.g.*, by employing blunt-ended or stagger-ended termini for ligation, restriction enzyme digestion to provide for appropriate termini, filling-in of cohesive ends as appropriate, alkaline phosphatase treatment to avoid undesirable joining, and enzymatic ligation. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of gene fragments can be carried out using anchor primers that give rise to complementary overhangs between two consecutive gene fragments that can subsequently be annealed and reamplified to generate a chimeric gene sequence (see, for example, Ausubel et al. (eds.) CURRENT PROTOCOLS IN MOLECULAR BIOLOGY,

John Wiley & Sons, 1992). Moreover, many expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide). An ORX-encoding nucleic acid can be cloned into such an expression vector such that the fusion moiety is linked in-frame to the ORX protein.

5

ORX agonists and antagonists

The present invention also pertains to variants of the ORX proteins that function as either ORX agonists (mimetics) or as ORX antagonists. Variants of the ORX protein can be generated by mutagenesis, *e.g.*, discrete point mutation or truncation of the ORX protein. An agonist of the ORX protein can retain substantially the same, or a subset of, the biological activities of the naturally occurring form of the ORX protein. An antagonist of the ORX protein can inhibit one or more of the activities of the naturally occurring form of the ORX protein by, for example, competitively binding to a downstream or upstream member of a cellular signaling cascade which includes the ORX protein. Thus, specific biological effects can be elicited by treatment with a variant of limited function. In one embodiment, treatment of a subject with a variant having a subset of the biological activities of the naturally occurring form of the protein has fewer side effects in a subject relative to treatment with the naturally occurring form of the ORX proteins.

Variants of the ORX protein that function as either ORX agonists (mimetics) or as ORX antagonists can be identified by screening combinatorial libraries of mutants, *e.g.*, truncation mutants, of the ORX protein for ORX protein agonist or antagonist activity. In one embodiment, a variegated library of ORX variants is generated by combinatorial mutagenesis at the nucleic acid level and is encoded by a variegated gene library. A variegated library of ORX variants can be produced by, for example, enzymatically ligating a mixture of synthetic oligonucleotides into gene sequences such that a degenerate set of potential ORX sequences is expressible as individual polypeptides, or alternatively, as a set of larger fusion proteins (*e.g.*, for phage display) containing the set of ORX sequences therein. There are a variety of methods which can be used to produce libraries of potential ORX variants from a degenerate oligonucleotide sequence. Chemical synthesis of a degenerate gene sequence can be performed in an automatic DNA synthesizer, and the synthetic gene then ligated into an appropriate expression vector. Use

of a degenerate set of genes allows for the provision, in one mixture, of all of the sequences encoding the desired set of potential ORX sequences. Methods for synthesizing degenerate oligonucleotides are known in the art (see, e.g., Narang (1983) *Tetrahedron* 39:3; Itakura *et al.* (1984) *Annu Rev Biochem* 53:323; Itakura *et al.* (1984) *Science* 198:1056; Ike *et al.* (1983) *Nucl Acid Res* 11:477.

5 Polypeptide libraries

In addition, libraries of fragments of the ORX protein coding sequence can be used to generate a variegated population of ORX fragments for screening and subsequent selection of variants of an ORX protein. In one embodiment, a library of coding sequence fragments can be generated by treating a double stranded PCR fragment of an ORX coding sequence with a nuclease under conditions wherein nicking occurs only about once per molecule, denaturing the double stranded DNA, renaturing the DNA to form double stranded DNA that can include sense/antisense pairs from different nicked products, removing single stranded portions from reformed duplexes by treatment with S1 nuclease, and ligating the resulting fragment library into an expression vector. By this method, an expression library can be derived which encodes N-terminal and internal fragments of various sizes of the ORX protein.

Several techniques are known in the art for screening gene products of combinatorial libraries made by point mutations or truncation, and for screening cDNA libraries for gene products having a selected property. Such techniques are adaptable for rapid screening of the gene libraries generated by the combinatorial mutagenesis of ORX proteins. The most widely used techniques, which are amenable to high throughput analysis, for screening large gene libraries typically include cloning the gene library into replicable expression vectors, transforming appropriate cells with the resulting library of vectors, and expressing the combinatorial genes under conditions in which detection of a desired activity facilitates isolation of the vector encoding the gene whose product was detected. Recursive ensemble mutagenesis (REM), a new technique that enhances the frequency of functional mutants in the libraries, can be used in combination with the screening assays to identify ORX variants (Arkin and Yourvan (1992) PNAS 89:7811-7815; Delgrave *et al.* (1993) Protein Engineering 6:327-331).

ORX Antibodies

Also included in the invention are antibodies to ORX proteins, or fragments of ORX proteins. The term "antibody" as used herein refers to immunoglobulin molecules and immunologically active portions of immunoglobulin (Ig) molecules, *i.e.*, molecules that contain an antigen binding site that specifically binds (immunoreacts with) an antigen. Such antibodies include, but are not limited to, polyclonal, monoclonal, chimeric, single chain, F_{ab} , $F_{ab'}$ and $F_{(ab')2}$ fragments, and an F_{ab} expression library. In general, an antibody molecule obtained from humans relates to any of the classes IgG, IgM, IgA, IgE and IgD, which differ from one another by the nature of the heavy chain present in the molecule. Certain classes have subclasses as well, such as IgG₁, IgG₂, and others. Furthermore, in humans, the light chain may be a kappa chain or a lambda chain. Reference herein to antibodies includes a reference to all such classes, subclasses and types of human antibody species.

An isolated ORX-related protein of the invention may be intended to serve as an antigen, or a portion or fragment thereof, and additionally can be used as an immunogen to generate antibodies that immunospecifically bind the antigen, using standard techniques for polyclonal and monoclonal antibody preparation. The full-length protein can be used or, alternatively, the invention provides antigenic peptide fragments of the antigen for use as immunogens. An antigenic peptide fragment comprises at least 6 amino acid residues of the amino acid sequence of the full length protein and encompasses an epitope thereof such that an antibody raised against the peptide forms a specific immune complex with the full length protein or with any fragment that contains the epitope. Preferably, the antigenic peptide comprises at least 10 amino acid residues, or at least 15 amino acid residues, or at least 20 amino acid residues, or at least 30 amino acid residues. Preferred epitopes encompassed by the antigenic peptide are regions of the protein that are located on its surface; commonly these are hydrophilic regions.

In certain embodiments of the invention, at least one epitope encompassed by the antigenic peptide is a region of ORX-related protein that is located on the surface of the protein, *e.g.*, a hydrophilic region. A hydrophobicity analysis of the human ORX-related protein sequence will indicate which regions of an ORX-related protein are particularly hydrophilic and, therefore, are likely to encode surface residues useful for targeting antibody production. As a means for targeting antibody production, hydropathy plots showing regions of hydrophilicity and

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hydrophobicity may be generated by any method well known in the art, including, for example, the Kyte Doolittle or the Hopp Woods methods, either with or without Fourier transformation. See, e.g., Hopp and Woods, 1981, *Proc. Nat. Acad. Sci. USA* 78: 3824-3828; Kyte and Doolittle 1982, *J. Mol. Biol.* 157: 105-142, each of which is incorporated herein by reference in its entirety. Antibodies that are specific for one or more domains within an antigenic protein, or derivatives, fragments, analogs or homologs thereof, are also provided herein.

A protein of the invention, or a derivative, fragment, analog, homolog or ortholog thereof, may be utilized as an immunogen in the generation of antibodies that immunospecifically bind these protein components.

Various procedures known within the art may be used for the production of polyclonal or monoclonal antibodies directed against a protein of the invention, or against derivatives, fragments, analogs homologs or orthologs thereof (see, for example, *Antibodies: A Laboratory Manual*, Harlow E, and Lane D, 1988, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, incorporated herein by reference). Some of these antibodies are discussed below.

Polyclonal Antibodies

For the production of polyclonal antibodies, various suitable host animals (e.g., rabbit, goat, mouse or other mammal) may be immunized by one or more injections with the native protein, a synthetic variant thereof, or a derivative of the foregoing. An appropriate immunogenic preparation can contain, for example, the naturally occurring immunogenic protein, a chemically synthesized polypeptide representing the immunogenic protein, or a recombinantly expressed immunogenic protein. Furthermore, the protein may be conjugated to a second protein known to be immunogenic in the mammal being immunized. Examples of such immunogenic proteins include but are not limited to keyhole limpet hemocyanin, serum albumin, bovine thyroglobulin, and soybean trypsin inhibitor. The preparation can further include an adjuvant. Various adjuvants used to increase the immunological response include, but are not limited to, Freund's (complete and incomplete), mineral gels (e.g., aluminum hydroxide), surface active substances (e.g., lyssolecithin, pluronic polyols, polyanions, peptides, oil emulsions, dinitrophenol, etc.), adjuvants usable in humans such as Bacille Calmette-Guerin and *Corynebacterium parvum*, or similar immunostimulatory agents. Additional examples of

adjuvants which can be employed include MPL-TDM adjuvant (monophosphoryl Lipid A, synthetic trehalose dicorynomycolate).

The polyclonal antibody molecules directed against the immunogenic protein can be isolated from the mammal (*e.g.*, from the blood) and further purified by well known techniques, such as affinity chromatography using protein A or protein G, which provide primarily the IgG fraction of immune serum. Subsequently, or alternatively, the specific antigen which is the target of the immunoglobulin sought, or an epitope thereof, may be immobilized on a column to purify the immune specific antibody by immunoaffinity chromatography. Purification of immunoglobulins is discussed, for example, by D. Wilkinson (The Scientist, published by The Scientist, Inc., Philadelphia PA, Vol. 14, No. 8 (April 17, 2000), pp. 25-28).

Monoclonal Antibodies

The term "monoclonal antibody" (MAb) or "monoclonal antibody composition", as used herein, refers to a population of antibody molecules that contain only one molecular species of antibody molecule consisting of a unique light chain gene product and a unique heavy chain gene product. In particular, the complementarity determining regions (CDRs) of the monoclonal antibody are identical in all the molecules of the population. MAbs thus contain an antigen binding site capable of immunoreacting with a particular epitope of the antigen characterized by a unique binding affinity for it.

Monoclonal antibodies can be prepared using hybridoma methods, such as those described by Kohler and Milstein, *Nature*, 256:495 (1975). In a hybridoma method, a mouse, hamster, or other appropriate host animal, is typically immunized with an immunizing agent to elicit lymphocytes that produce or are capable of producing antibodies that will specifically bind to the immunizing agent. Alternatively, the lymphocytes can be immunized *in vitro*.

The immunizing agent will typically include the protein antigen, a fragment thereof or a fusion protein thereof. Generally, either peripheral blood lymphocytes are used if cells of human origin are desired, or spleen cells or lymph node cells are used if non-human mammalian sources are desired. The lymphocytes are then fused with an immortalized cell line using a suitable fusing agent, such as polyethylene glycol, to form a hybridoma cell (*Goding, Monoclonal Antibodies: Principles and Practice*, Academic Press, (1986) pp. 59-103). Immortalized cell lines

are usually transformed mammalian cells, particularly myeloma cells of rodent, bovine and human origin. Usually, rat or mouse myeloma cell lines are employed. The hybridoma cells can be cultured in a suitable culture medium that preferably contains one or more substances that inhibit the growth or survival of the unfused, immortalized cells. For example, if the parental 5 cells lack the enzyme hypoxanthine guanine phosphoribosyl transferase (HGPRT or HPRT), the culture medium for the hybridomas typically will include hypoxanthine, aminopterin, and thymidine ("HAT medium"), which substances prevent the growth of HGPRT-deficient cells.

Preferred immortalized cell lines are those that fuse efficiently, support stable high level expression of antibody by the selected antibody-producing cells, and are sensitive to a medium 10 such as HAT medium. More preferred immortalized cell lines are murine myeloma lines, which can be obtained, for instance, from the Salk Institute Cell Distribution Center, San Diego, California and the American Type Culture Collection, Manassas, Virginia. Human myeloma and mouse-human heteromyeloma cell lines also have been described for the production of human 15 monoclonal antibodies (Kozbor, J. Immunol., 133:3001 (1984); Brodeur et al., Monoclonal Antibody Production Techniques and Applications, Marcel Dekker, Inc., New York, (1987) pp. 51-63).

The culture medium in which the hybridoma cells are cultured can then be assayed for the presence of monoclonal antibodies directed against the antigen. Preferably, the binding specificity of monoclonal antibodies produced by the hybridoma cells is determined by immunoprecipitation or by an *in vitro* binding assay, such as radioimmunoassay (RIA) or 20 enzyme-linked immunoabsorbent assay (ELISA). Such techniques and assays are known in the art. The binding affinity of the monoclonal antibody can, for example, be determined by the Scatchard analysis of Munson and Pollard, Anal. Biochem., 107:220 (1980). Preferably, antibodies having a high degree of specificity and a high binding affinity for the target antigen 25 are isolated.

After the desired hybridoma cells are identified, the clones can be subcloned by limiting dilution procedures and grown by standard methods. Suitable culture media for this purpose include, for example, Dulbecco's Modified Eagle's Medium and RPMI-1640 medium. Alternatively, the hybridoma cells can be grown *in vivo* as ascites in a mammal.

The monoclonal antibodies secreted by the subclones can be isolated or purified from the culture medium or ascites fluid by conventional immunoglobulin purification procedures such as, for example, protein A-Sepharose, hydroxylapatite chromatography, gel electrophoresis, dialysis, or affinity chromatography.

5 The monoclonal antibodies can also be made by recombinant DNA methods, such as those described in U.S. Patent No. 4,816,567. DNA encoding the monoclonal antibodies of the invention can be readily isolated and sequenced using conventional procedures (*e.g.*, by using oligonucleotide probes that are capable of binding specifically to genes encoding the heavy and light chains of murine antibodies). The hybridoma cells of the invention serve as a preferred 10 source of such DNA. Once isolated, the DNA can be placed into expression vectors, which are then transfected into host cells such as simian COS cells, Chinese hamster ovary (CHO) cells, or myeloma cells that do not otherwise produce immunoglobulin protein, to obtain the synthesis of monoclonal antibodies in the recombinant host cells. The DNA also can be modified, for example, by substituting the coding sequence for human heavy and light chain constant domains 15 in place of the homologous murine sequences (U.S. Patent No. 4,816,567; Morrison, Nature 368, 812-13 (1994)) or by covalently joining to the immunoglobulin coding sequence all or part of the coding sequence for a non-immunoglobulin polypeptide. Such a non-immunoglobulin polypeptide can be substituted for the constant domains of an antibody of the invention, or can be substituted for the variable domains of one antigen-combining site of an antibody of the 20 invention to create a chimeric bivalent antibody.

Humanized Antibodies

The antibodies directed against the protein antigens of the invention can further comprise humanized antibodies or human antibodies. These antibodies are suitable for administration to 25 humans without engendering an immune response by the human against the administered immunoglobulin. Humanized forms of antibodies are chimeric immunoglobulins, immunoglobulin chains or fragments thereof (such as Fv, Fab, Fab', F(ab')₂ or other antigen-binding subsequences of antibodies) that are principally comprised of the sequence of a human immunoglobulin, and contain minimal sequence derived from a non-human immunoglobulin. 30 Humanization can be performed following the method of Winter and co-workers (Jones et al.,

Nature, 321:522-525 (1986); Riechmann et al., Nature, 332:323-327 (1988); Verhoeyen et al., Science, 239:1534-1536 (1988)), by substituting rodent CDRs or CDR sequences for the corresponding sequences of a human antibody. (See also U.S. Patent No. 5,225,539.) In some instances, Fv framework residues of the human immunoglobulin are replaced by corresponding non-human residues. Humanized antibodies can also comprise residues which are found neither in the recipient antibody nor in the imported CDR or framework sequences. In general, the humanized antibody will comprise substantially all of at least one, and typically two, variable domains, in which all or substantially all of the CDR regions correspond to those of a non-human immunoglobulin and all or substantially all of the framework regions are those of a human immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at least a portion of an immunoglobulin constant region (Fc), typically that of a human immunoglobulin (Jones et al., 1986; Riechmann et al., 1988; and Presta, Curr. Op. Struct. Biol., 2:593-596 (1992)).

Human Antibodies

Fully human antibodies relate to antibody molecules in which essentially the entire sequences of both the light chain and the heavy chain, including the CDRs, arise from human genes. Such antibodies are termed "human antibodies", or "fully human antibodies" herein. Human monoclonal antibodies can be prepared by the trioma technique; the human B-cell hybridoma technique (see Kozbor, et al., 1983 Immunol Today 4: 72) and the EBV hybridoma technique to produce human monoclonal antibodies (see Cole, et al., 1985 In: MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96). Human monoclonal antibodies may be utilized in the practice of the present invention and may be produced by using human hybridomas (see Cote, et al., 1983. Proc Natl Acad Sci USA 80: 2026-2030) or by transforming human B-cells with Epstein Barr Virus *in vitro* (see Cole, et al., 1985 In: MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96).

In addition, human antibodies can also be produced using additional techniques, including phage display libraries (Hoogenboom and Winter, J. Mol. Biol., 227:381 (1991); Marks et al., J. Mol. Biol., 222:581 (1991)). Similarly, human antibodies can be made by introducing human immunoglobulin loci into transgenic animals, e.g., mice in which the

endogenous immunoglobulin genes have been partially or completely inactivated. Upon challenge, human antibody production is observed, which closely resembles that seen in humans in all respects, including gene rearrangement, assembly, and antibody repertoire. This approach is described, for example, in U.S. Patent Nos. 5,545,807; 5,545,806; 5,569,825; 5,625,126; 5,633,425; 5,661,016, and in Marks et al. (Bio/Technology 10, 779-783 (1992)); Lonberg et al. (Nature 368 856-859 (1994)); Morrison (Nature 368, 812-13 (1994)); Fishwild et al., (Nature Biotechnology 14, 845-51 (1996)); Neuberger (Nature Biotechnology 14, 826 (1996)); and Lonberg and Huszar (Intern. Rev. Immunol. 13 65-93 (1995)).

Human antibodies may additionally be produced using transgenic nonhuman animals which are modified so as to produce fully human antibodies rather than the animal's endogenous antibodies in response to challenge by an antigen. (See PCT publication WO94/02602). The endogenous genes encoding the heavy and light immunoglobulin chains in the nonhuman host have been incapacitated, and active loci encoding human heavy and light chain immunoglobulins are inserted into the host's genome. The human genes are incorporated, for example, using yeast artificial chromosomes containing the requisite human DNA segments. An animal which provides all the desired modifications is then obtained as progeny by crossbreeding intermediate transgenic animals containing fewer than the full complement of the modifications. The preferred embodiment of such a nonhuman animal is a mouse, and is termed the XenomouseTM as disclosed in PCT publications WO 96/33735 and WO 96/34096. This animal produces B cells which secrete fully human immunoglobulins. The antibodies can be obtained directly from the animal after immunization with an immunogen of interest, as, for example, a preparation of a polyclonal antibody, or alternatively from immortalized B cells derived from the animal, such as hybridomas producing monoclonal antibodies. Additionally, the genes encoding the immunoglobulins with human variable regions can be recovered and expressed to obtain the antibodies directly, or can be further modified to obtain analogs of antibodies such as, for example, single chain Fv molecules.

An example of a method of producing a nonhuman host, exemplified as a mouse, lacking expression of an endogenous immunoglobulin heavy chain is disclosed in U.S. Patent No. 5,939,598. It can be obtained by a method including deleting the J segment genes from at least one endogenous heavy chain locus in an embryonic stem cell to prevent rearrangement of the

locus and to prevent formation of a transcript of a rearranged immunoglobulin heavy chain locus, the deletion being effected by a targeting vector containing a gene encoding a selectable marker; and producing from the embryonic stem cell a transgenic mouse whose somatic and germ cells contain the gene encoding the selectable marker.

5 A method for producing an antibody of interest, such as a human antibody, is disclosed in U.S. Patent No. 5,916,771. It includes introducing an expression vector that contains a nucleotide sequence encoding a heavy chain into one mammalian host cell in culture, introducing an expression vector containing a nucleotide sequence encoding a light chain into another mammalian host cell, and fusing the two cells to form a hybrid cell. The hybrid cell expresses an 10 antibody containing the heavy chain and the light chain.

In a further improvement on this procedure, a method for identifying a clinically relevant epitope on an immunogen, and a correlative method for selecting an antibody that binds immunospecifically to the relevant epitope with high affinity, are disclosed in PCT publication WO 99/53049.

15 **F_{ab} Fragments and Single Chain Antibodies**

According to the invention, techniques can be adapted for the production of single-chain antibodies specific to an antigenic protein of the invention (see e.g., U.S. Patent No. 4,946,778). In addition, methods can be adapted for the construction of F_{ab} expression libraries (see e.g., 20 Huse, et al., 1989 Science 246: 1275-1281) to allow rapid and effective identification of monoclonal F_{ab} fragments with the desired specificity for a protein or derivatives, fragments, analogs or homologs thereof. Antibody fragments that contain the idiotypes to a protein antigen may be produced by techniques known in the art including, but not limited to: (i) an F_{(ab')2} fragment produced by pepsin digestion of an antibody molecule; (ii) an F_{ab} fragment generated 25 by reducing the disulfide bridges of an F_{(ab')2} fragment; (iii) an F_{ab} fragment generated by the treatment of the antibody molecule with papain and a reducing agent and (iv) F_v fragments.

Bispecific Antibodies

Bispecific antibodies are monoclonal, preferably human or humanized, antibodies that 30 have binding specificities for at least two different antigens. In the present case, one of the

binding specificities is for an antigenic protein of the invention. The second binding target is any other antigen, and advantageously is a cell-surface protein or receptor or receptor subunit.

Methods for making bispecific antibodies are known in the art. Traditionally, the recombinant production of bispecific antibodies is based on the co-expression of two immunoglobulin heavy-chain/light-chain pairs, where the two heavy chains have different specificities (Milstein and Cuello, *Nature*, 305:537-539 (1983)). Because of the random assortment of immunoglobulin heavy and light chains, these hybridomas (quadromas) produce a potential mixture of ten different antibody molecules, of which only one has the correct bispecific structure. The purification of the correct molecule is usually accomplished by affinity chromatography steps. Similar procedures are disclosed in WO 93/08829, published 13 May 1993, and in Traunecker *et al.*, 1991 *EMBO J.*, 10:3655-3659.

Antibody variable domains with the desired binding specificities (antibody-antigen combining sites) can be fused to immunoglobulin constant domain sequences. The fusion preferably is with an immunoglobulin heavy-chain constant domain, comprising at least part of the hinge, CH₂, and CH₃ regions. It is preferred to have the first heavy-chain constant region (CH₁) containing the site necessary for light-chain binding present in at least one of the fusions. DNAs encoding the immunoglobulin heavy-chain fusions and, if desired, the immunoglobulin light chain, are inserted into separate expression vectors, and are co-transfected into a suitable host organism. For further details of generating bispecific antibodies see, for example, Suresh *et al.*, *Methods in Enzymology*, 121:210 (1986).

According to another approach described in WO 96/27011, the interface between a pair of antibody molecules can be engineered to maximize the percentage of heterodimers which are recovered from recombinant cell culture. The preferred interface comprises at least a part of the CH₃ region of an antibody constant domain. In this method, one or more small amino acid side chains from the interface of the first antibody molecule are replaced with larger side chains (*e.g.* tyrosine or tryptophan). Compensatory “cavities” of identical or similar size to the large side chain(s) are created on the interface of the second antibody molecule by replacing large amino acid side chains with smaller ones (*e.g.* alanine or threonine). This provides a mechanism for increasing the yield of the heterodimer over other unwanted end-products such as homodimers.

Bispecific antibodies can be prepared as full length antibodies or antibody fragments (*e.g.* F(ab')₂ bispecific antibodies). Techniques for generating bispecific antibodies from antibody fragments have been described in the literature. For example, bispecific antibodies can be prepared using chemical linkage. Brennan et al., Science 229:81 (1985) describe a procedure wherein intact antibodies are proteolytically cleaved to generate F(ab')₂ fragments. These fragments are reduced in the presence of the dithiol complexing agent sodium arsenite to stabilize vicinal dithiols and prevent intermolecular disulfide formation. The Fab' fragments generated are then converted to thionitrobenzoate (TNB) derivatives. One of the Fab'-TNB derivatives is then reconverted to the Fab'-thiol by reduction with mercaptoethylamine and is mixed with an equimolar amount of the other Fab'-TNB derivative to form the bispecific antibody. The bispecific antibodies produced can be used as agents for the selective immobilization of enzymes.

Additionally, Fab' fragments can be directly recovered from *E. coli* and chemically coupled to form bispecific antibodies. Shalaby et al., J. Exp. Med. 175:217-225 (1992) describe the production of a fully humanized bispecific antibody F(ab')₂ molecule. Each Fab' fragment was separately secreted from *E. coli* and subjected to directed chemical coupling *in vitro* to form the bispecific antibody. The bispecific antibody thus formed was able to bind to cells overexpressing the ErbB2 receptor and normal human T cells, as well as trigger the lytic activity of human cytotoxic lymphocytes against human breast tumor targets.

Various techniques for making and isolating bispecific antibody fragments directly from recombinant cell culture have also been described. For example, bispecific antibodies have been produced using leucine zippers. Kostelny et al., J. Immunol. 148(5):1547-1553 (1992). The leucine zipper peptides from the Fos and Jun proteins were linked to the Fab' portions of two different antibodies by gene fusion. The antibody homodimers were reduced at the hinge region to form monomers and then re-oxidized to form the antibody heterodimers. This method can also be utilized for the production of antibody homodimers. The "diabody" technology described by Hollinger et al., Proc. Natl. Acad. Sci. USA 90:6444-6448 (1993) has provided an alternative mechanism for making bispecific antibody fragments. The fragments comprise a heavy-chain variable domain (V_H) connected to a light-chain variable domain (V_L) by a linker which is too short to allow pairing between the two domains on the same chain. Accordingly, the V_H and V_L

domains of one fragment are forced to pair with the complementary V_L and V_H domains of another fragment, thereby forming two antigen-binding sites. Another strategy for making bispecific antibody fragments by the use of single-chain Fv (sFv) dimers has also been reported. See, Gruber et al., *J. Immunol.* 152:5368 (1994).

5 Antibodies with more than two valencies are contemplated. For example, trispecific antibodies can be prepared. Tutt et al., *J. Immunol.* 147:60 (1991).

Exemplary bispecific antibodies can bind to two different epitopes, at least one of which originates in the protein antigen of the invention. Alternatively, an anti-antigenic arm of an immunoglobulin molecule can be combined with an arm which binds to a triggering molecule on a leukocyte such as a T-cell receptor molecule (*e.g.* CD2, CD3, CD28, or B7), or Fc receptors for IgG (Fc R), such as Fc RI (CD64), Fc RII (CD32) and Fc RIII (CD16) so as to focus cellular defense mechanisms to the cell expressing the particular antigen. Bispecific antibodies can also be used to direct cytotoxic agents to cells which express a particular antigen. These antibodies possess an antigen-binding arm and an arm which binds a cytotoxic agent or a radionuclide chelator, such as EOTUBE, DPTA, DOTA, or TETA. Another bispecific antibody of interest binds the protein antigen described herein and further binds tissue factor (TF).

Heteroconjugate Antibodies

Heteroconjugate antibodies are also within the scope of the present invention.

20 Heteroconjugate antibodies are composed of two covalently joined antibodies. Such antibodies have, for example, been proposed to target immune system cells to unwanted cells (U.S. Patent No. 4,676,980), and for treatment of HIV infection (WO 91/00360; WO 92/200373; EP 03089). It is contemplated that the antibodies can be prepared *in vitro* using known methods in synthetic protein chemistry, including those involving crosslinking agents. For example, immunotoxins 25 can be constructed using a disulfide exchange reaction or by forming a thioether bond. Examples of suitable reagents for this purpose include iminothiolate and methyl-4-mercaptobutyrimidate and those disclosed, for example, in U.S. Patent No. 4,676,980.

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Effector Function Engineering

It can be desirable to modify the antibody of the invention with respect to effector function, so as to enhance, *e.g.*, the effectiveness of the antibody in treating cancer. For example, cysteine residue(s) can be introduced into the Fc region, thereby allowing interchain disulfide bond formation in this region. The homodimeric antibody thus generated can have improved internalization capability and/or increased complement-mediated cell killing and antibody-dependent cellular cytotoxicity (ADCC). See Caron et al., *J. Exp Med.*, 176: 1191-1195 (1992) and Shopes, *J. Immunol.*, 148: 2918-2922 (1992). Homodimeric antibodies with enhanced anti-tumor activity can also be prepared using heterobifunctional cross-linkers as described in Wolff et al. *Cancer Research*, 53: 2560-2565 (1993). Alternatively, an antibody can be engineered that has dual Fc regions and can thereby have enhanced complement lysis and ADCC capabilities. See Stevenson et al., *Anti-Cancer Drug Design*, 3: 219-230 (1989).

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Immunoconjugates

The invention also pertains to immunoconjugates comprising an antibody conjugated to a cytotoxic agent such as a chemotherapeutic agent, toxin (*e.g.*, an enzymatically active toxin of bacterial, fungal, plant, or animal origin, or fragments thereof), or a radioactive isotope (*i.e.*, a radioconjugate).

Chemotherapeutic agents useful in the generation of such immunoconjugates have been described above. Enzymatically active toxins and fragments thereof that can be used include diphtheria A chain, nonbinding active fragments of diphtheria toxin, exotoxin A chain (from *Pseudomonas aeruginosa*), ricin A chain, abrin A chain, modeccin A chain, alpha-sarcin, *Aleurites fordii* proteins, dianthin proteins, *Phytolaca americana* proteins (PAPI, PAPII, and PAP-S), *momordica charantia* inhibitor, curcin, crotin, sapaonaria officinalis inhibitor, gelonin, mitogellin, restrictocin, phenomycin, enomycin, and the trichothecenes. A variety of radionuclides are available for the production of radioconjugated antibodies. Examples include ²¹²Bi, ¹³¹I, ¹³¹In, ⁹⁰Y, and ¹⁸⁶Re.

Conjugates of the antibody and cytotoxic agent are made using a variety of bifunctional protein-coupling agents such as N-succinimidyl-3-(2-pyridyldithiol) propionate (SPDP), iminothiolane (IT), bifunctional derivatives of imidoesters (such as dimethyl adipimidate HCL),

active esters (such as disuccinimidyl suberate), aldehydes (such as glutaraldehyde), bis-azido compounds (such as bis (p-azidobenzoyl) hexanediamine), bis-diazonium derivatives (such as bis-(p-diazoniumbenzoyl)-ethylenediamine), diisocyanates (such as tolyene 2,6-diisocyanate), and bis-active fluorine compounds (such as 1,5-difluoro-2,4-dinitrobenzene). For example, a
5 ricin immunotoxin can be prepared as described in Vitetta et al., Science, 238: 1098 (1987). Carbon-14-labeled 1-isothiocyanatobenzyl-3-methyldiethylene triaminepentaacetic acid (MX-DTPA) is an exemplary chelating agent for conjugation of radionucleotide to the antibody. See WO94/11026.

In another embodiment, the antibody can be conjugated to a "receptor" (such streptavidin)
10 for utilization in tumor pretargeting wherein the antibody-receptor conjugate is administered to the patient, followed by removal of unbound conjugate from the circulation using a clearing agent and then administration of a "ligand" (*e.g.*, avidin) that is in turn conjugated to a cytotoxic agent.
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ORX Recombinant Expression Vectors and Host Cells

Another aspect of the invention pertains to vectors, preferably expression vectors, containing a nucleic acid encoding an ORX protein, or derivatives, fragments, analogs or homologs thereof. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (*e.g.*, bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (*e.g.*, non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Moreover, certain vectors are capable of directing the expression of genes to which they are operatively-linked. Such vectors are referred to herein as "expression vectors". In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids. In the present specification, "plasmid" and "vector" can be 20 used interchangeably as the plasmid is the most commonly used form of vector. However, the
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invention is intended to include such other forms of expression vectors, such as viral vectors (*e.g.*, replication defective retroviruses, adenoviruses and adeno-associated viruses), which serve equivalent functions.

The recombinant expression vectors of the invention comprise a nucleic acid of the invention in a form suitable for expression of the nucleic acid in a host cell, which means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, that is operatively-linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably-linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner that allows for expression of the nucleotide sequence (*e.g.*, in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell).

The term "regulatory sequence" is intended to includes promoters, enhancers and other expression control elements (*e.g.*, polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence in many types of host cell and those that direct expression of the nucleotide sequence only in certain host cells (*e.g.*, tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of protein desired, etc. The expression vectors of the invention can be introduced into host cells to thereby produce proteins or peptides, including fusion proteins or peptides, encoded by nucleic acids as described herein (*e.g.*, ORX proteins, mutant forms of ORX proteins, fusion proteins, etc.).

The recombinant expression vectors of the invention can be designed for expression of ORX proteins in prokaryotic or eukaryotic cells. For example, ORX proteins can be expressed in bacterial cells such as *Escherichia coli*, insect cells (using baculovirus expression vectors) yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Expression of proteins in prokaryotes is most often carried out in *Escherichia coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or non-fusion proteins. Fusion vectors add a number of amino acids to a protein encoded therein, usually to the amino terminus of the recombinant protein. Such fusion vectors typically serve 5 three purposes: (i) to increase expression of recombinant protein; (ii) to increase the solubility of the recombinant protein; and (iii) to aid in the purification of the recombinant protein by acting as a ligand in affinity purification. Often, in fusion expression vectors, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant protein to enable separation of the recombinant protein from the fusion moiety subsequent to purification of the 10 fusion protein. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith and Johnson, 1988. *Gene* 67: 31-40), pMAL (New England Biolabs, Beverly, Mass.) and pRIT5 (Pharmacia, Piscataway, N.J.) that fuse glutathione S-transferase (GST), maltose E binding protein, or protein A, respectively, to the target recombinant protein.

15 Examples of suitable inducible non-fusion *E. coli* expression vectors include pTrc (Amrann *et al.*, (1988) *Gene* 69:301-315) and pET 11d (Studier *et al.*, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 60-89).

20 One strategy to maximize recombinant protein expression in *E. coli* is to express the protein in a host bacteria with an impaired capacity to proteolytically cleave the recombinant protein. See, e.g., Gottesman, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 119-128. Another strategy is to alter the nucleic acid sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (see, e.g., Wada, *et al.*, 1992. *Nucl. 25 Acids Res.* 20: 2111-2118). Such alteration of nucleic acid sequences of the invention can be carried out by standard DNA synthesis techniques.

In another embodiment, the ORX expression vector is a yeast expression vector. Examples of vectors for expression in yeast *Saccharomyces cerevisiae* include pYEpSec1 (Baldari, *et al.*, 1987. *EMBO J.* 6: 229-234), pMfA (Kurjan and Herskowitz, 1982. *Cell* 30:

933-943), pJRY88 (Schultz *et al.*, 1987. *Gene* 54: 113-123), pYES2 (Invitrogen Corporation, San Diego, Calif.), and picZ (InVitrogen Corp, San Diego, Calif.).

Alternatively, ORX can be expressed in insect cells using baculovirus expression vectors. Baculovirus vectors available for expression of proteins in cultured insect cells (*e.g.*, SF9 cells) include the pAc series (Smith, *et al.*, 1983. *Mol. Cell. Biol.* 3: 2156-2165) and the pVL series (Lucklow and Summers, 1989. *Virology* 170: 31-39).

In yet another embodiment, a nucleic acid of the invention is expressed in mammalian cells using a mammalian expression vector. Examples of mammalian expression vectors include pCDM8 (Seed, 1987. *Nature* 329: 840) and pMT2PC (Kaufman, *et al.*, 1987. *EMBO J.* 6: 187-195). When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, adenovirus 2, cytomegalovirus, and simian virus 40. For other suitable expression systems for both prokaryotic and eukaryotic cells see, *e.g.*, Chapters 16 and 17 of Sambrook, *et al.*, MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989.

In another embodiment, the recombinant mammalian expression vector is capable of directing expression of the nucleic acid preferentially in a particular cell type (*e.g.*, tissue-specific regulatory elements are used to express the nucleic acid). Tissue-specific regulatory elements are known in the art. Non-limiting examples of suitable tissue-specific promoters include the albumin promoter (liver-specific; Pinkert, *et al.*, 1987. *Genes Dev.* 1: 268-277), lymphoid-specific promoters (Calame and Eaton, 1988. *Adv. Immunol.* 43: 235-275), in particular promoters of T cell receptors (Winoto and Baltimore, 1989. *EMBO J.* 8: 729-733) and immunoglobulins (Banerji, *et al.*, 1983. *Cell* 33: 729-740; Queen and Baltimore, 1983. *Cell* 33: 741-748), neuron-specific promoters (*e.g.*, the neurofilament promoter; Byrne and Ruddle, 1989. *Proc. Natl. Acad. Sci. USA* 86: 5473-5477), pancreas-specific promoters (Edlund, *et al.*, 1985. *Science* 230: 912-916), and mammary gland-specific promoters (*e.g.*, milk whey promoter; U.S. Pat. No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are also encompassed, *e.g.*, the murine hox promoters (Kessel and Gruss, 1990. *Science* 249: 374-379) and the α -fetoprotein promoter (Campes and Tilghman, 1989. *Genes Dev.* 3: 537-546).

The invention further provides a recombinant expression vector comprising a DNA molecule of the invention cloned into the expression vector in an antisense orientation. That is, the DNA molecule is operatively-linked to a regulatory sequence in a manner that allows for expression (by transcription of the DNA molecule) of an RNA molecule that is antisense to ORX mRNA. Regulatory sequences operatively linked to a nucleic acid cloned in the antisense orientation can be chosen that direct the continuous expression of the antisense RNA molecule in a variety of cell types, for instance viral promoters and/or enhancers, or regulatory sequences can be chosen that direct constitutive, tissue specific or cell type specific expression of antisense RNA. The antisense expression vector can be in the form of a recombinant plasmid, phagemid or attenuated virus in which antisense nucleic acids are produced under the control of a high efficiency regulatory region, the activity of which can be determined by the cell type into which the vector is introduced. For a discussion of the regulation of gene expression using antisense genes see, e.g., Weintraub, *et al.*, "Antisense RNA as a molecular tool for genetic analysis," *Reviews-Trends in Genetics*, Vol. 1(1) 1986.

Another aspect of the invention pertains to host cells into which a recombinant expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A host cell can be any prokaryotic or eukaryotic cell. For example, ORX protein can be expressed in bacterial cells such as *E. coli*, insect cells, yeast or mammalian cells (such as human, Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (e.g., DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation.

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Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.* (MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989), and other laboratory manuals.

5 For stable transfection of mammalian cells, it is known that, depending upon the expression vector and transfection technique used, only a small fraction of cells may integrate the foreign DNA into their genome. In order to identify and select these integrants, a gene that encodes a selectable marker (*e.g.*, resistance to antibiotics) is generally introduced into the host cells along with the gene of interest. Various selectable markers include those that confer 10 resistance to drugs, such as G418, hygromycin and methotrexate. Nucleic acid encoding a selectable marker can be introduced into a host cell on the same vector as that encoding ORX or can be introduced on a separate vector. Cells stably transfected with the introduced nucleic acid can be identified by drug selection (*e.g.*, cells that have incorporated the selectable marker gene will survive, while the other cells die).

15 A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) ORX protein. Accordingly, the invention further provides methods for producing ORX protein using the host cells of the invention. In one embodiment, the method comprises culturing the host cell of invention (into which a recombinant expression vector encoding ORX protein has been introduced) in a suitable medium such that ORX protein is produced. In another embodiment, the method further comprises isolating ORX protein from 20 the medium or the host cell.

Transgenic ORX Animals

25 The host cells of the invention can also be used to produce non-human transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which ORX protein-coding sequences have been introduced. Such host cells can then be used to create non-human transgenic animals in which exogenous ORX sequences have been introduced into their genome or homologous recombinant animals in which endogenous ORX sequences have been altered. Such animals are useful for studying the 30 function and/or activity of ORX protein and for identifying and/or evaluating modulators of

ORX protein activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of the cells of the animal includes a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens, amphibians, etc. A transgene is exogenous DNA

5 that is integrated into the genome of a cell from which a transgenic animal develops and that remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more cell types or tissues of the transgenic animal. As used herein, a "homologous recombinant animal" is a non-human animal, preferably a mammal, more preferably a mouse, in which an endogenous ORX gene has been altered by homologous

10 recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, *e.g.*, an embryonic cell of the animal, prior to development of the animal.

A transgenic animal of the invention can be created by introducing ORX-encoding nucleic acid into the male pronuclei of a fertilized oocyte (*e.g.*, by microinjection, retroviral infection) and allowing the oocyte to develop in a pseudopregnant female foster animal. Sequences including GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 can be introduced as a transgene into the genome of a non-human animal. Alternatively, a non-human homologue of the human ORX gene, such as a mouse ORX gene, can be isolated based on hybridization to the human ORX cDNA (described further *supra*) and used as a transgene. Intronic sequences and polyadenylation signals can also be included in the transgene to increase the efficiency of expression of the transgene. A tissue-specific regulatory sequence(s) can be operably-linked to the ORX transgene to direct expression of ORX protein to particular cells. Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866; 4,870,009; 20 25 and 4,873,191; and Hogan, 1986. In: MANIPULATING THE MOUSE EMBRYO, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y. Similar methods are used for production of other transgenic animals. A transgenic founder animal can be identified based upon the presence of the ORX transgene in its genome and/or expression of ORX mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the

transgene. Moreover, transgenic animals carrying a transgene-encoding ORX protein can further be bred to other transgenic animals carrying other transgenes.

To create a homologous recombinant animal, a vector is prepared which contains at least a portion of an ORX gene into which a deletion, addition or substitution has been introduced to thereby alter, *e.g.*, functionally disrupt, the ORX gene. The ORX gene can be a human gene, but more preferably, is a non-human homologue of a human ORX gene. For example, a mouse homologue of human ORX gene of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, can be used to construct a homologous recombination vector suitable for altering an endogenous ORX gene in the mouse genome. In one embodiment, the vector is designed such that, upon homologous recombination, the endogenous ORX gene is functionally disrupted (*i.e.*, no longer encodes a functional protein; also referred to as a "knock out" vector).

Alternatively, the vector can be designed such that, upon homologous recombination, the endogenous ORX gene is mutated or otherwise altered but still encodes functional protein (*e.g.*, the upstream regulatory region can be altered to thereby alter the expression of the endogenous ORX protein). In the homologous recombination vector, the altered portion of the ORX gene is flanked at its 5'- and 3'-termini by additional nucleic acid of the ORX gene to allow for homologous recombination to occur between the exogenous ORX gene carried by the vector and an endogenous ORX gene in an embryonic stem cell. The additional flanking ORX nucleic acid is of sufficient length for successful homologous recombination with the endogenous gene.

Typically, several kilobases of flanking DNA (both at the 5'- and 3'-termini) are included in the vector. *See, e.g.*, Thomas, *et al.*, 1987. *Cell* 51: 503 for a description of homologous recombination vectors. The vector is then introduced into an embryonic stem cell line (*e.g.*, by electroporation) and cells in which the introduced ORX gene has homologously-recombined with the endogenous ORX gene are selected. *See, e.g.*, Li, *et al.*, 1992. *Cell* 69: 915.

The selected cells are then injected into a blastocyst of an animal (*e.g.*, a mouse) to form aggregation chimeras. *See, e.g.*, Bradley, 1987. In: TERATOCARCINOMAS AND EMBRYONIC STEM CELLS: A PRACTICAL APPROACH, Robertson, ed. IRL, Oxford, pp. 113-152. A chimeric embryo can then be implanted into a suitable pseudopregnant female foster animal and the embryo brought to term. Progeny harboring the homologously-recombined DNA in their germ cells can

be used to breed animals in which all cells of the animal contain the homologously-recombined DNA by germline transmission of the transgene. Methods for constructing homologous recombination vectors and homologous recombinant animals are described further in Bradley, 1991. *Curr. Opin. Biotechnol.* 2: 823-829; PCT International Publication Nos.: WO 90/11354; 5 WO 91/01140; WO 92/0968; and WO 93/04169.

In another embodiment, transgenic non-humans animals can be produced that contain selected systems that allow for regulated expression of the transgene. One example of such a system is the cre/loxP recombinase system of bacteriophage P1. For a description of the cre/loxP recombinase system, See, e.g., Lakso, et al., 1992. *Proc. Natl. Acad. Sci. USA* 89: 6232-6236.

10 Another example of a recombinase system is the FLP recombinase system of *Saccharomyces cerevisiae*. See, O'Gorman, et al., 1991. *Science* 251:1351-1355. If a cre/loxP recombinase system is used to regulate expression of the transgene, animals containing transgenes encoding both the Cre recombinase and a selected protein are required. Such animals can be provided through the construction of "double" transgenic animals, e.g., by mating two transgenic animals, one containing a transgene encoding a selected protein and the other containing a transgene encoding a recombinase.

15 Clones of the non-human transgenic animals described herein can also be produced according to the methods described in Wilmut, et al., 1997. *Nature* 385: 810-813. In brief, a cell (e.g., a somatic cell) from the transgenic animal can be isolated and induced to exit the growth cycle and enter G₀ phase. The quiescent cell can then be fused, e.g., through the use of electrical pulses, to an enucleated oocyte from an animal of the same species from which the quiescent cell is isolated. The reconstructed oocyte is then cultured such that it develops to morula or blastocyst and then transferred to pseudopregnant female foster animal. The offspring borne of this female foster animal will be a clone of the animal from which the cell (e.g., the somatic cell) 20 is isolated.

Pharmaceutical Compositions

The ORX nucleic acid molecules, ORX proteins, and anti-ORX antibodies (also referred to herein as "active compounds") of the invention, and derivatives, fragments, analogs and 30 homologs thereof, can be incorporated into pharmaceutical compositions suitable for

administration. Such compositions typically comprise the nucleic acid molecule, protein, or antibody and a pharmaceutically acceptable carrier. As used herein, "pharmaceutically acceptable carrier" is intended to include any and all solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Suitable carriers are described in the most recent edition of Remington's Pharmaceutical Sciences, a standard reference text in the field, which is incorporated herein by reference. Preferred examples of such carriers or diluents include, but are not limited to, water, saline, finger's solutions, dextrose solution, and 5% human serum albumin. Liposomes and non-aqueous vehicles such as fixed oils may also be used. The use of such media and agents for pharmaceutically active substances is well known in the art. Except insofar as any conventional media or agent is incompatible with the active compound, use thereof in the compositions is contemplated. Supplementary active compounds can also be incorporated into the compositions.

The antibodies disclosed herein can also be formulated as immunoliposomes.

Liposomes containing the antibody are prepared by methods known in the art, such as described in Epstein et al., Proc. Natl. Acad. Sci. USA, 82: 3688 (1985); Hwang et al., Proc. Natl. Acad. Sci. USA, 77: 4030 (1980); and U.S. Pat. Nos. 4,485,045 and 4,544,545. Liposomes with enhanced circulation time are disclosed in U.S. Patent No. 5,013,556.

Particularly useful liposomes can be generated by the reverse-phase evaporation method with a lipid composition comprising phosphatidylcholine, cholesterol, and PEG-derivatized phosphatidylethanolamine (PEG-PE). Liposomes are extruded through filters of defined pore size to yield liposomes with the desired diameter. Fab' fragments of the antibody of the present invention can be conjugated to the liposomes as described in Martin et al., J. Biol. Chem., 257: 286-288 (1982) via a disulfide-interchange reaction. A chemotherapeutic agent (such as Doxorubicin) is optionally contained within the liposome. See Gabizon et al., J. National Cancer Inst., 81(19): 1484 (1989).

A pharmaceutical composition of the invention is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, e.g., intravenous, intradermal, subcutaneous, oral (e.g., inhalation), transdermal (*i.e.*, topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral,

intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerine, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as

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ethylenediaminetetraacetic acid (EDTA); buffers such as acetates, citrates or phosphates, and agents for the adjustment of tonicity such as sodium chloride or dextrose. The pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

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Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, N.J.) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringeability exists. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as manitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

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Sterile injectable solutions can be prepared by incorporating the active compound (*e.g.*, an ORX protein or anti-ORX antibody) in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization.

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Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle that contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, methods of preparation are vacuum drying and freeze-drying that yields a powder of
5 the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

Oral compositions generally include an inert diluent or an edible carrier. They can be enclosed in gelatin capsules or compressed into tablets. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of
10 tablets, troches, or capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash, wherein the compound in the fluid carrier is applied orally and swished and expectorated or swallowed. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the like can contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a
15 disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

20 For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, e.g., a gas such as carbon dioxide, or a nebulizer.

Systemic administration can also be by transmucosal or transdermal means. For
25 transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art.

The compounds can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

In one embodiment, the active compounds are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. The materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

It is especially advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers to physically discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier. The specification for the dosage unit forms of the invention are dictated by and directly dependent on the unique characteristics of the active compound and the particular therapeutic effect to be achieved, and the limitations inherent in the art of compounding such an active compound for the treatment of individuals.

The nucleic acid molecules of the invention can be inserted into vectors and used as gene therapy vectors. Gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.*, U.S. Patent No. 5,328,470) or by stereotactic injection (*see, e.g.*, Chen, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 3054-3057). The pharmaceutical preparation of the gene therapy vector can include the gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant

cells, e.g., retroviral vectors, the pharmaceutical preparation can include one or more cells that produce the gene delivery system.

Antibodies specifically binding a protein of the invention, as well as other molecules identified by the screening assays disclosed herein, can be administered for the treatment of various disorders in the form of pharmaceutical compositions. Principles and considerations involved in preparing such compositions, as well as guidance in the choice of components are provided, for example, in Remington : The Science And Practice Of Pharmacy 19th ed. (Alfonso R. Gennaro, et al., editors) Mack Pub. Co., Easton, Pa.: 1995; Drug Absorption Enhancement : Concepts, Possibilities, Limitations, And Trends, Harwood Academic Publishers, Langhorne, Pa., 1994; and Peptide And Protein Drug Delivery (Advances In Parenteral Sciences, Vol. 4), 1991, M. Dekker, New York. If the antigenic protein is intracellular and whole antibodies are used as inhibitors, internalizing antibodies are preferred. However, liposomes can also be used to deliver the antibody, or an antibody fragment, into cells. Where antibody fragments are used, the smallest inhibitory fragment that specifically binds to the binding domain of the target protein is preferred. For example, based upon the variable-region sequences of an antibody, peptide molecules can be designed that retain the ability to bind the target protein sequence. Such peptides can be synthesized chemically and/or produced by recombinant DNA technology. See, e.g., Marasco *et al.*, 1993 *Proc. Natl. Acad. Sci. USA*, 90: 7889-7893. The formulation herein can also contain more than one active compound as necessary for the particular indication being treated, preferably those with complementary activities that do not adversely affect each other. Alternatively, or in addition, the composition can comprise an agent that enhances its function, such as, for example, a cytotoxic agent, cytokine, chemotherapeutic agent, or growth-inhibitory agent. Such molecules are suitably present in combination in amounts that are effective for the purpose intended. The active ingredients can also be entrapped in microcapsules prepared, for example, by coacervation techniques or by interfacial polymerization, for example, hydroxymethylcellulose or gelatin-microcapsules and poly-(methylmethacrylate) microcapsules, respectively, in colloidal drug delivery systems (for example, liposomes, albumin microspheres, microemulsions, nano-particles, and nanocapsules) or in macroemulsions.

The formulations to be used for *in vivo* administration must be sterile. This is readily accomplished by filtration through sterile filtration membranes.

Sustained-release preparations can be prepared. Suitable examples of sustained-release preparations include semipermeable matrices of solid hydrophobic polymers containing the antibody, which matrices are in the form of shaped articles, *e.g.*, films, or microcapsules. Examples of sustained-release matrices include polyesters, hydrogels (for example, poly(2-hydroxyethyl-methacrylate), or poly(vinylalcohol)), polylactides (U.S. Pat. No. 3,773,919), copolymers of L-glutamic acid and ethyl-L-glutamate, non-degradable ethylene-vinyl acetate, degradable lactic acid-glycolic acid copolymers such as the LUPRON DEPOT™ (injectable microspheres composed of lactic acid-glycolic acid copolymer and leuprolide acetate), and poly-D-(*l*)-3-hydroxybutyric acid. While polymers such as ethylene-vinyl acetate and lactic acid-glycolic acid enable release of molecules for over 100 days, certain hydrogels release proteins for shorter time periods.

The pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

Screening and Detection Methods

The isolated nucleic acid molecules of the invention can be used to express ORX protein (*e.g.*, via a recombinant expression vector in a host cell in gene therapy applications), to detect ORX mRNA (*e.g.*, in a biological sample) or a genetic lesion in an ORX gene, and to modulate ORX activity, as described further, below. In addition, the ORX proteins can be used to screen drugs or compounds that modulate the ORX protein activity or expression as well as to treat disorders characterized by insufficient or excessive production of ORX protein or production of ORX protein forms that have decreased or aberrant activity compared to ORX wild-type protein. In addition, the anti-ORX antibodies of the invention can be used to detect and isolate ORX proteins and modulate ORX activity. For example, ORX activity includes growth and differentiation, antibody production, and tumor growth.

The invention further pertains to novel agents identified by the screening assays described herein and uses thereof for treatments as described, *supra*.

Screening Assays

The invention provides a method (also referred to herein as a "screening assay") for identifying modulators, *i.e.*, candidate or test compounds or agents (*e.g.*, peptides,

peptidomimetics, small molecules or other drugs) that bind to ORX proteins or have a stimulatory or inhibitory effect on, e.g., ORX protein expression or ORX protein activity. The invention also includes compounds identified in the screening assays described herein.

In one embodiment, the invention provides assays for screening candidate or test
5 compounds which bind to or modulate the activity of the membrane-bound form of an ORX protein or polypeptide or biologically-active portion thereof. The test compounds of the invention can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; the
10 "one-bead one-compound" library method; and synthetic library methods using affinity chromatography selection. The biological library approach is limited to peptide libraries, while the other four approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds. See, e.g., Lam, 1997. *Anticancer Drug Design* 12: 145.

A "small molecule" as used herein, is meant to refer to a composition that has a molecular weight of less than about 5 kD and most preferably less than about 4 kD. Small molecules can be, e.g., nucleic acids, peptides, polypeptides, peptidomimetics, carbohydrates, lipids or other organic or inorganic molecules. Libraries of chemical and/or biological mixtures, such as fungal, bacterial, or algal extracts, are known in the art and can be screened with any of the assays of the invention.

20 Examples of methods for the synthesis of molecular libraries can be found in the art, for example in: DeWitt, et al., 1993. *Proc. Natl. Acad. Sci. U.S.A.* 90: 6909; Erb, et al., 1994. *Proc. Natl. Acad. Sci. U.S.A.* 91: 11422; Zuckermann, et al., 1994. *J. Med. Chem.* 37: 2678; Cho, et al., 1993. *Science* 261: 1303; Carrell, et al., 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2059; Carell, et al., 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2061; and Gallop, et al., 1994. *J. Med. Chem.* 37:

25 1233.

Libraries of compounds may be presented in solution (e.g., Houghten, 1992. *Biotechniques* 13: 412-421), or on beads (Lam, 1991. *Nature* 354: 82-84), on chips (Fodor, 1993. *Nature* 364: 555-556), bacteria (Ladner, U.S. Patent No. 5,223,409), spores (Ladner, U.S. Patent 5,233,409), plasmids (Cull, et al., 1992. *Proc. Natl. Acad. Sci. USA* 89: 1865-1869) or on phage
30 (Scott and Smith, 1990. *Science* 249: 386-390; Devlin, 1990. *Science* 249: 404-406; Cwirla, et

al., 1990. *Proc. Natl. Acad. Sci. U.S.A.* 87: 6378-6382; Felici, 1991. *J. Mol. Biol.* 222: 301-310; Ladner, U.S. Patent No. 5,233,409.).

In one embodiment, an assay is a cell-based assay in which a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface is contacted with a test compound and the ability of the test compound to bind to an ORX protein determined. The cell, for example, can be of mammalian origin or a yeast cell.

Determining the ability of the test compound to bind to the ORX protein can be accomplished, for example, by coupling the test compound with a radioisotope or enzymatic label such that binding of the test compound to the ORX protein or biologically-active portion thereof can be determined by detecting the labeled compound in a complex. For example, test compounds can be labeled with ^{125}I , ^{35}S , ^{14}C , or ^3H , either directly or indirectly, and the radioisotope detected by direct counting of radioemission or by scintillation counting. Alternatively, test compounds can be enzymatically-labeled with, for example, horseradish peroxidase, alkaline phosphatase, or luciferase, and the enzymatic label detected by determination of conversion of an appropriate substrate to product. In one embodiment, the assay comprises contacting a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX protein or a biologically-active portion thereof as compared to the known compound.

In another embodiment, an assay is a cell-based assay comprising contacting a cell expressing a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a test compound and determining the ability of the test compound to modulate (*e.g.*, stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the activity of ORX or a biologically-active portion thereof can be accomplished, for example, by determining the ability of the ORX protein to bind to or interact with an ORX target molecule. As used herein, a "target molecule" is a molecule with which an ORX protein binds or interacts in nature, for example, a molecule on the surface of a cell which expresses an ORX interacting protein, a molecule on the

surface of a second cell, a molecule in the extracellular milieu, a molecule associated with the internal surface of a cell membrane or a cytoplasmic molecule. An ORX target molecule can be a non-ORX molecule or an ORX protein or polypeptide of the invention. In one embodiment, an ORX target molecule is a component of a signal transduction pathway that facilitates

- 5 transduction of an extracellular signal (*e.g.* a signal generated by binding of a compound to a membrane-bound ORX molecule) through the cell membrane and into the cell. The target, for example, can be a second intercellular protein that has catalytic activity or a protein that facilitates the association of downstream signaling molecules with ORX.

Determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by one of the methods described above for determining direct binding. In one embodiment, determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by determining the activity of the target molecule. For example, the activity of the target molecule can be determined by detecting induction of a cellular second messenger of the target (*i.e.* intracellular Ca^{2+} , diacylglycerol, IP_3 , etc.), detecting catalytic/enzymatic activity of the target an appropriate substrate, detecting the induction of a reporter gene (comprising an ORX-responsive regulatory element operatively linked to a nucleic acid encoding a detectable marker, *e.g.*, luciferase), or detecting a cellular response, for example, cell survival, cellular differentiation, or cell proliferation.

In yet another embodiment, an assay of the invention is a cell-free assay comprising contacting an ORX protein or biologically-active portion thereof with a test compound and determining the ability of the test compound to bind to the ORX protein or biologically-active portion thereof. Binding of the test compound to the ORX protein can be determined either directly or indirectly as described above. In one such embodiment, the assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX or biologically-active portion thereof as compared to the known compound.

In still another embodiment, an assay is a cell-free assay comprising contacting ORX protein or biologically-active portion thereof with a test compound and determining the ability of the test compound to modulate (*e.g.* stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the 5 activity of ORX can be accomplished, for example, by determining the ability of the ORX protein to bind to an ORX target molecule by one of the methods described above for determining direct binding. In an alternative embodiment, determining the ability of the test compound to modulate the activity of ORX protein can be accomplished by determining the ability of the ORX protein further modulate an ORX target molecule. For example, the 10 catalytic/enzymatic activity of the target molecule on an appropriate substrate can be determined as described above.

In yet another embodiment, the cell-free assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX protein to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the ORX protein to preferentially bind to or modulate the activity of an ORX target molecule.

The cell-free assays of the invention are amenable to use of both the soluble form or the membrane-bound form of ORX protein. In the case of cell-free assays comprising the membrane-bound form of ORX protein, it may be desirable to utilize a solubilizing agent such that the membrane-bound form of ORX protein is maintained in solution. Examples of such solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside, n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-methylglucamide, Triton® X-100, Triton® X-114, Thesit®, Isotridecypoly(ethylene glycol ether)_n, N-dodecyl-20 N,N-dimethyl-3-ammonio-1-propane sulfonate, 3-(3-cholamidopropyl) dimethylamminiol-1-propane sulfonate (CHAPS), or 3-(3-cholamidopropyl)dimethylamminiol-2-hydroxy-1-propane sulfonate (CHAPSO).

In more than one embodiment of the above assay methods of the invention, it may be desirable to immobilize either ORX protein or its target molecule to facilitate separation of 30 complexed from uncomplexed forms of one or both of the proteins, as well as to accommodate

automation of the assay. Binding of a test compound to ORX protein, or interaction of ORX protein with a target molecule in the presence and absence of a candidate compound, can be accomplished in any vessel suitable for containing the reactants. Examples of such vessels include microtiter plates, test tubes, and micro-centrifuge tubes. In one embodiment, a fusion protein can be provided that adds a domain that allows one or both of the proteins to be bound to a matrix. For example, GST-ORX fusion proteins or GST-target fusion proteins can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivatized microtiter plates, that are then combined with the test compound or the test compound and either the non-adsorbed target protein or ORX protein, and the mixture is incubated under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, the matrix immobilized in the case of beads, complex determined either directly or indirectly, for example, as described, *supra*. Alternatively, the complexes can be dissociated from the matrix, and the level of ORX protein binding or activity determined using standard techniques.

Other techniques for immobilizing proteins on matrices can also be used in the screening assays of the invention. For example, either the ORX protein or its target molecule can be immobilized utilizing conjugation of biotin and streptavidin. Biotinylated ORX protein or target molecules can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques well-known within the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, Ill.), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). Alternatively, antibodies reactive with ORX protein or target molecules, but which do not interfere with binding of the ORX protein to its target molecule, can be derivatized to the wells of the plate, and unbound target or ORX protein trapped in the wells by antibody conjugation. Methods for detecting such complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the ORX protein or target molecule, as well as enzyme-linked assays that rely on detecting an enzymatic activity associated with the ORX protein or target molecule.

In another embodiment, modulators of ORX protein expression are identified in a method wherein a cell is contacted with a candidate compound and the expression of ORX mRNA or protein in the cell is determined. The level of expression of ORX mRNA or protein in the

presence of the candidate compound is compared to the level of expression of ORX mRNA or protein in the absence of the candidate compound. The candidate compound can then be identified as a modulator of ORX mRNA or protein expression based upon this comparison. For example, when expression of ORX mRNA or protein is greater (*i.e.*, statistically significantly greater) in the presence of the candidate compound than in its absence, the candidate compound is identified as a stimulator of ORX mRNA or protein expression. Alternatively, when expression of ORX mRNA or protein is less (statistically significantly less) in the presence of the candidate compound than in its absence, the candidate compound is identified as an inhibitor of ORX mRNA or protein expression. The level of ORX mRNA or protein expression in the cells can be determined by methods described herein for detecting ORX mRNA or protein.

In yet another aspect of the invention, the ORX proteins can be used as "bait proteins" in a two-hybrid assay or three hybrid assay (*see, e.g.*, U.S. Patent No. 5,283,317; Zervos, *et al.*, 1993. *Cell* 72: 223-232; Madura, *et al.*, 1993. *J. Biol. Chem.* 268: 12046-12054; Bartel, *et al.*, 1993. *Biotechniques* 14: 920-924; Iwabuchi, *et al.*, 1993. *Oncogene* 8: 1693-1696; and Brent WO 94/10300), to identify other proteins that bind to or interact with ORX ("ORX-binding proteins" or "ORX-bp") and modulate ORX activity. Such ORX-binding proteins are also likely to be involved in the propagation of signals by the ORX proteins as, for example, upstream or downstream elements of the ORX pathway.

The two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. Briefly, the assay utilizes two different DNA constructs. In one construct, the gene that codes for ORX is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.*, GAL-4). In the other construct, a DNA sequence, from a library of DNA sequences, that encodes an unidentified protein ("prey" or "sample") is fused to a gene that codes for the activation domain of the known transcription factor. If the "bait" and the "prey" proteins are able to interact, *in vivo*, forming an ORX-dependent complex, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) that is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the

functional transcription factor can be isolated and used to obtain the cloned gene that encodes the protein which interacts with ORX.

The invention further pertains to novel agents identified by the aforementioned screening assays and uses thereof for treatments as described herein.

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Detection Assays

Portions or fragments of the cDNA sequences identified herein (and the corresponding complete gene sequences) can be used in numerous ways as polynucleotide reagents. By way of example, and not of limitation, these sequences can be used to: (i) identify an individual from a minute biological sample (tissue typing); and (ii) aid in forensic identification of a biological sample. Some of these applications are described in the subsections, below.

Tissue Typing

The ORX sequences of the invention can be used to identify individuals from minute biological samples. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identification. The sequences of the invention are useful as additional DNA markers for RFLP ("restriction fragment length polymorphisms," described in U.S. Patent No. 5,272,057).

Furthermore, the sequences of the invention can be used to provide an alternative technique that determines the actual base-by-base DNA sequence of selected portions of an individual's genome. Thus, the ORX sequences described herein can be used to prepare two PCR primers from the 5'- and 3'-termini of the sequences. These primers can then be used to amplify an individual's DNA and subsequently sequence it.

Panels of corresponding DNA sequences from individuals, prepared in this manner, can provide unique individual identifications, as each individual will have a unique set of such DNA sequences due to allelic differences. The sequences of the invention can be used to obtain such identification sequences from individuals and from tissue. The ORX sequences of the invention uniquely represent portions of the human genome. Allelic variation occurs to some degree in the coding regions of these sequences, and to a greater degree in the noncoding regions. It is estimated that allelic variation between individual humans occurs with a frequency of about once

per each 500 bases. Much of the allelic variation is due to single nucleotide polymorphisms (SNPs), which include restriction fragment length polymorphisms (RFLPs).

Each of the sequences described herein can, to some degree, be used as a standard against which DNA from an individual can be compared for identification purposes. Because greater numbers of polymorphisms occur in the noncoding regions, fewer sequences are necessary to differentiate individuals. The noncoding sequences can comfortably provide positive individual identification with a panel of perhaps 10 to 1,000 primers that each yield a noncoding amplified sequence of 100 bases. If predicted coding sequences are used, a more appropriate number of primers for positive individual identification would be 500-2,000.

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Predictive Medicine

The invention also pertains to the field of predictive medicine in which diagnostic assays, prognostic assays, pharmacogenomics, and monitoring clinical trials are used for prognostic (predictive) purposes to thereby treat an individual prophylactically. Accordingly, one aspect of the invention relates to diagnostic assays for determining ORX protein and/or nucleic acid expression as well as ORX activity, in the context of a biological sample (*e.g.*, blood, serum, cells, tissue) to thereby determine whether an individual is afflicted with a disease or disorder, or is at risk of developing a disorder, associated with aberrant ORX expression or activity.

Disorders associated with aberrant ORX expression or activity include, for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

The invention also provides for prognostic (or predictive) assays for determining whether an individual is at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. For example, mutations in an ORX gene can be assayed in a biological sample. Such assays can be used for prognostic or predictive purpose to thereby prophylactically treat an individual prior to the onset of a disorder characterized by or associated with ORX protein, nucleic acid expression, or biological activity.

Another aspect of the invention provides methods for determining ORX protein, nucleic acid expression or activity in an individual to thereby select appropriate therapeutic or prophylactic agents for that individual (referred to herein as "pharmacogenomics").

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Pharmacogenomics allows for the selection of agents (*e.g.*, drugs) for therapeutic or prophylactic treatment of an individual based on the genotype of the individual (*e.g.*, the genotype of the individual examined to determine the ability of the individual to respond to a particular agent.)

Yet another aspect of the invention pertains to monitoring the influence of agents (*e.g.*,
5 drugs, compounds) on the expression or activity of ORX in clinical trials.

These and other agents are described in further detail in the following sections.

Diagnostic Assays

An exemplary method for detecting the presence or absence of ORX in a biological sample involves obtaining a biological sample from a test subject and contacting the biological sample with a compound or an agent capable of detecting ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) that encodes ORX protein such that the presence of ORX is detected in the biological sample. An agent for detecting ORX mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to ORX mRNA or genomic DNA. The nucleic acid probe can be, for example, a full-length ORX nucleic acid, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500 nucleotides in length and sufficient to specifically hybridize under stringent conditions to ORX mRNA or genomic DNA. Other suitable probes for use in the diagnostic assays of the invention are described herein.

One agent for detecting ORX protein is an antibody capable of binding to ORX protein, preferably an antibody with a detectable label. Antibodies directed against a protein of the invention may be used in methods known within the art relating to the localization and/or quantitation of the protein (*e.g.*, for use in measuring levels of the protein within appropriate physiological samples, for use in diagnostic methods, for use in imaging the protein, and the like). In a given embodiment, antibodies against the proteins, or derivatives, fragments, analogs or homologs thereof, that contain the antigen binding domain, are utilized as
20 pharmacologically-active compounds.

An antibody specific for a protein of the invention can be used to isolate the protein by standard techniques, such as immunoaffinity chromatography or immunoprecipitation. Such an antibody can facilitate the purification of the natural protein antigen from cells and of recombinantly produced antigen expressed in host cells. Moreover, such an antibody can be used
30 to detect the antigenic protein (*e.g.*, in a cellular lysate or cell supernatant) in order to evaluate

the abundance and pattern of expression of the antigenic protein. Antibodies directed against the protein can be used diagnostically to monitor protein levels in tissue as part of a clinical testing procedure, *e.g.*, to, for example, determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance.

- 5 Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I , ^{131}I , ^{35}S or ^3H .
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Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a fragment thereof (*e.g.*, Fab or F(ab')₂) can be used. The term "labeled", with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with another reagent that is directly labeled. Examples of indirect labeling include detection of a primary antibody using a fluorescently-labeled secondary antibody and end-labeling of a DNA probe with biotin such that it can be detected with fluorescently-labeled streptavidin. The term "biological sample" is intended to include tissues, cells and biological fluids isolated from a subject, as well as tissues, cells and fluids present within a subject. That is, the detection method of the invention can be used to detect ORX mRNA, protein, or genomic DNA in a biological sample *in vitro* as well as *in vivo*. For example, *in vitro* techniques for detection of ORX mRNA include Northern hybridizations and *in situ* hybridizations. *In vitro* techniques for detection of ORX protein include enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations, and immunofluorescence. *In vitro* techniques for detection of ORX genomic DNA include Southern hybridizations. Furthermore, *in vivo* techniques for detection of ORX protein include introducing into a subject a labeled anti-ORX antibody. For example, the antibody can be

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labeled with a radioactive marker whose presence and location in a subject can be detected by standard imaging techniques.

In one embodiment, the biological sample contains protein molecules from the test subject. Alternatively, the biological sample can contain mRNA molecules from the test subject or genomic DNA molecules from the test subject. A preferred biological sample is a peripheral blood leukocyte sample isolated by conventional means from a subject.

In one embodiment, the methods further involve obtaining a control biological sample from a control subject, contacting the control sample with a compound or agent capable of detecting ORX protein, mRNA, or genomic DNA, such that the presence of ORX protein, mRNA or genomic DNA is detected in the biological sample, and comparing the presence of ORX protein, mRNA or genomic DNA in the control sample with the presence of ORX protein, mRNA or genomic DNA in the test sample.

The invention also encompasses kits for detecting the presence of ORX in a biological sample. For example, the kit can comprise: a labeled compound or agent capable of detecting ORX protein or mRNA in a biological sample; means for determining the amount of ORX in the sample; and means for comparing the amount of ORX in the sample with a standard. The compound or agent can be packaged in a suitable container. The kit can further comprise instructions for using the kit to detect ORX protein or nucleic acid.

Prognostic Assays

The diagnostic methods described herein can furthermore be utilized to identify subjects having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. For example, the assays described herein, such as the preceding diagnostic assays or the following assays, can be utilized to identify a subject having or at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. Such disorders include for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

Alternatively, the prognostic assays can be utilized to identify a subject having or at risk for developing a disease or disorder. Thus, the invention provides a method for identifying a disease or disorder associated with aberrant ORX expression or activity in which a test sample is obtained from a subject and ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) is

detected, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. As used herein, a "test sample" refers to a biological sample obtained from a subject of interest. For example, a test sample can be a biological fluid (e.g., serum), cell sample, or tissue.

5 Furthermore, the prognostic assays described herein can be used to determine whether a subject can be administered an agent (e.g., an agonist, antagonist, peptidomimetic, protein, peptide, nucleic acid, small molecule, or other drug candidate) to treat a disease or disorder associated with aberrant ORX expression or activity. For example, such methods can be used to determine whether a subject can be effectively treated with an agent for a disorder. Thus, the
10 invention provides methods for determining whether a subject can be effectively treated with an agent for a disorder associated with aberrant ORX expression or activity in which a test sample is obtained and ORX protein or nucleic acid is detected (e.g., wherein the presence of ORX protein or nucleic acid is diagnostic for a subject that can be administered the agent to treat a disorder associated with aberrant ORX expression or activity).

15 The methods of the invention can also be used to detect genetic lesions in an ORX gene, thereby determining if a subject with the lesioned gene is at risk for a disorder characterized by aberrant cell proliferation and/or differentiation. In various embodiments, the methods include detecting, in a sample of cells from the subject, the presence or absence of a genetic lesion characterized by at least one of an alteration affecting the integrity of a gene encoding an
20 ORX-protein, or the misexpression of the ORX gene. For example, such genetic lesions can be detected by ascertaining the existence of at least one of: (i) a deletion of one or more nucleotides from an ORX gene; (ii) an addition of one or more nucleotides to an ORX gene; (iii) a substitution of one or more nucleotides of an ORX gene, (iv) a chromosomal rearrangement of an ORX gene; (v) an alteration in the level of a messenger RNA transcript of an ORX gene, (vi)
25 aberrant modification of an ORX gene, such as of the methylation pattern of the genomic DNA, (vii) the presence of a non-wild-type splicing pattern of a messenger RNA transcript of an ORX gene, (viii) a non-wild-type level of an ORX protein, (ix) allelic loss of an ORX gene, and (x) inappropriate post-translational modification of an ORX protein. As described herein, there are a large number of assay techniques known in the art which can be used for detecting lesions in an
30 ORX gene, such as which is isolated by a method substantially similar to that used to isolate by

conventional means from a subject. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

In certain embodiments, detection of the lesion involves the use of a probe/primer in a polymerase chain reaction (PCR) (see, e.g., U.S. Patent Nos. 4,683,195 and 4,683,202), such as anchor PCR or RACE PCR, or, alternatively, in a ligation chain reaction (LCR) (see, e.g., 5 Landegran, *et al.*, 1988. *Science* 241: 1077-1080; and Nakazawa, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 360-364), the latter of which can be particularly useful for detecting point mutations in the ORX-gene (see, Abravaya, *et al.*, 1995. *Nucl. Acids Res.* 23: 675-682). This method can include the steps of collecting a sample of cells from a patient, isolating nucleic acid (e.g., 10 genomic, mRNA or both) from the cells of the sample, contacting the nucleic acid sample with one or more primers that specifically hybridize to an ORX gene under conditions such that hybridization and amplification of the ORX gene (if present) occurs, and detecting the presence or absence of an amplification product, or detecting the size of the amplification product and comparing the length to a control sample. It is anticipated that PCR and/or LCR may be 15 desirable to use as a preliminary amplification step in conjunction with any of the techniques used for detecting mutations described herein.

Alternative amplification methods include: self sustained sequence replication (see, Guatelli, *et al.*, 1990. *Proc. Natl. Acad. Sci. USA* 87: 1874-1878), transcriptional amplification system (see, Kwoh, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA* 86: 1173-1177); Q β Replicase (see, 20 Lizardi, *et al.*, 1988. *BioTechnology* 6: 1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

In an alternative embodiment, mutations in an ORX gene from a sample cell can be 25 identified by alterations in restriction enzyme cleavage patterns. For example, sample and control DNA is isolated, amplified (optionally), digested with one or more restriction endonucleases, and fragment length sizes are determined by gel electrophoresis and compared. Differences in fragment length sizes between sample and control DNA indicates mutations in the

5,493,531) can be used to score for the presence of specific mutations by development or loss of a ribozyme cleavage site.

In other embodiments, genetic mutations in ORX can be identified by hybridizing a sample and control nucleic acids, e.g., DNA or RNA, to high-density arrays containing hundreds or thousands of oligonucleotides probes. See, e.g., Cronin, et al., 1996. *Human Mutation* 7: 5 244-255; Kozal, et al., 1996. *Nat. Med.* 2: 753-759. For example, genetic mutations in ORX can be identified in two dimensional arrays containing light-generated DNA probes as described in Cronin, et al., *supra*. Briefly, a first hybridization array of probes can be used to scan through long stretches of DNA in a sample and control to identify base changes between the sequences 10 by making linear arrays of sequential overlapping probes. This step allows the identification of point mutations. This is followed by a second hybridization array that allows the characterization of specific mutations by using smaller, specialized probe arrays complementary to all variants or mutations detected. Each mutation array is composed of parallel probe sets, one complementary to the wild-type gene and the other complementary to the mutant gene.

15 In yet another embodiment, any of a variety of sequencing reactions known in the art can be used to directly sequence the ORX gene and detect mutations by comparing the sequence of the sample ORX with the corresponding wild-type (control) sequence. Examples of sequencing reactions include those based on techniques developed by Maxim and Gilbert, 1977. *Proc. Natl. Acad. Sci. USA* 74: 560 or Sanger, 1977. *Proc. Natl. Acad. Sci. USA* 74: 5463. It is also 20 contemplated that any of a variety of automated sequencing procedures can be utilized when performing the diagnostic assays (see, e.g., Naeve, et al., 1995. *Biotechniques* 19: 448), including sequencing by mass spectrometry (see, e.g., PCT International Publication No. WO 94/16101; Cohen, et al., 1996. *Adv. Chromatography* 36: 127-162; and Griffin, et al., 1993. *Appl. Biochem. Biotechnol.* 38: 147-159).

25 Other methods for detecting mutations in the ORX gene include methods in which protection from cleavage agents is used to detect mismatched bases in RNA/RNA or RNA/DNA heteroduplexes. See, e.g., Myers, et al., 1985. *Science* 230: 1242. In general, the art technique of "mismatch cleavage" starts by providing heteroduplexes formed by hybridizing (labeled) RNA or DNA containing the wild-type ORX sequence with potentially mutant RNA or DNA obtained 30 from a tissue sample. The double stranded duplexes are treated with an agent that cleaves

single-stranded regions of the duplex such as which will exist due to basepair mismatches between the control and sample strands. For instance, RNA/DNA duplexes can be treated with RNase and DNA/DNA hybrids treated with S₁ nuclease to enzymatically digesting the mismatched regions. In other embodiments, either DNA/DNA or RNA/DNA duplexes can be treated with hydroxylamine or osmium tetroxide and with piperidine in order to digest mismatched regions. After digestion of the mismatched regions, the resulting material is then separated by size on denaturing polyacrylamide gels to determine the site of mutation. See, e.g., 5 Cotton, et al., 1988. *Proc. Natl. Acad. Sci. USA* 85: 4397; Saleeba, et al., 1992. *Methods Enzymol.* 217: 286-295. In an embodiment, the control DNA or RNA can be labeled for 10 detection.

In still another embodiment, the mismatch cleavage reaction employs one or more proteins that recognize mismatched base pairs in double-stranded DNA (so called "DNA mismatch repair" enzymes) in defined systems for detecting and mapping point mutations in ORX cDNAs obtained from samples of cells. For example, the mutY enzyme of *E. coli* cleaves A at G/A mismatches and the thymidine DNA glycosylase from HeLa cells cleaves T at G/T mismatches. See, e.g., Hsu, et al., 1994. *Carcinogenesis* 15: 1657-1662. According to an exemplary embodiment, a probe based on an ORX sequence, e.g., a wild-type ORX sequence, is hybridized to a cDNA or other DNA product from a test cell(s). The duplex is treated with a DNA mismatch repair enzyme, and the cleavage products, if any, can be detected from 15 electrophoresis protocols or the like. See, e.g., U.S. Patent No. 5,459,039.

In other embodiments, alterations in electrophoretic mobility will be used to identify 20 mutations in ORX genes. For example, single strand conformation polymorphism (SSCP) may be used to detect differences in electrophoretic mobility between mutant and wild type nucleic acids. See, e.g., Orita, et al., 1989. *Proc. Natl. Acad. Sci. USA*: 86: 2766; Cotton, 1993. *Mutat. Res.* 285: 125-144; Hayashi, 1992. *Genet. Anal. Tech. Appl.* 9: 73-79. Single-stranded DNA fragments of sample and control ORX nucleic acids will be denatured and allowed to renature. The secondary structure of single-stranded nucleic acids varies according to sequence, the 25 resulting alteration in electrophoretic mobility enables the detection of even a single base change. The DNA fragments may be labeled or detected with labeled probes. The sensitivity of the assay

sensitive to a change in sequence. In one embodiment, the subject method utilizes heteroduplex analysis to separate double stranded heteroduplex molecules on the basis of changes in electrophoretic mobility. *See, e.g., Keen, et al., 1991. Trends Genet. 7: 5.*

In yet another embodiment, the movement of mutant or wild-type fragments in polyacrylamide gels containing a gradient of denaturant is assayed using denaturing gradient gel electrophoresis (DGGE). *See, e.g., Myers, et al., 1985. Nature 313: 495.* When DGGE is used as the method of analysis, DNA will be modified to insure that it does not completely denature, for example by adding a GC clamp of approximately 40 bp of high-melting GC-rich DNA by PCR. In a further embodiment, a temperature gradient is used in place of a denaturing gradient to identify differences in the mobility of control and sample DNA. *See, e.g., Rosenbaum and Reissner, 1987. Biophys. Chem. 265: 12753.*

Examples of other techniques for detecting point mutations include, but are not limited to, selective oligonucleotide hybridization, selective amplification, or selective primer extension. For example, oligonucleotide primers may be prepared in which the known mutation is placed centrally and then hybridized to target DNA under conditions that permit hybridization only if a perfect match is found. *See, e.g., Saiki, et al., 1986. Nature 324: 163; Saiki, et al., 1989. Proc. Natl. Acad. Sci. USA 86: 6230.* Such allele specific oligonucleotides are hybridized to PCR amplified target DNA or a number of different mutations when the oligonucleotides are attached to the hybridizing membrane and hybridized with labeled target DNA.

Alternatively, allele specific amplification technology that depends on selective PCR amplification may be used in conjunction with the instant invention. Oligonucleotides used as primers for specific amplification may carry the mutation of interest in the center of the molecule (so that amplification depends on differential hybridization; *see, e.g., Gibbs, et al., 1989. Nucl. Acids Res. 17: 2437-2448*) or at the extreme 3'-terminus of one primer where, under appropriate conditions, mismatch can prevent, or reduce polymerase extension (*see, e.g., Grossner, 1993. Tibtech. 11: 238*). In addition it may be desirable to introduce a novel restriction site in the region of the mutation to create cleavage-based detection. *See, e.g., Gasparini, et al., 1992. Mol. Cell Probes 6: 1.* It is anticipated that in certain embodiments amplification may also be performed using *Taq* ligase for amplification. *See, e.g., Barany, 1991. Proc. Natl. Acad. Sci. USA 88: 189.* In such cases, ligation will occur only if there is a perfect match at the 3'-terminus

of the 5' sequence, making it possible to detect the presence of a known mutation at a specific site by looking for the presence or absence of amplification.

The methods described herein may be performed, for example, by utilizing pre-packaged diagnostic kits comprising at least one probe nucleic acid or antibody reagent described herein, which may be conveniently used, e.g., in clinical settings to diagnose patients exhibiting symptoms or family history of a disease or illness involving an ORX gene.

Furthermore, any cell type or tissue, preferably peripheral blood leukocytes, in which ORX is expressed may be utilized in the prognostic assays described herein. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

The invention will be further described in the following examples, which do not limit the scope of the invention described in the claims.

EXAMPLE 1: Cloning and analysis of ORX-like sequences in primates and mouse.

The isolation of ORX-related sequences has been described in Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. Briefly, 100 ng of genomic DNA from each species was subjected to PCR using consensus ORX primers

OR5B-OR3B (OR5B (TM2), 5'-

CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' ;

PMY(F/L)FL(S/A/T/G/C)NLS ; OR3B (TM7), (SEQ ID NO: 432) 5'-

AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433) ;

M(L/F/V/I)NPF(I/M)Y(S/C)L) (SEQ ID NO:434). See Ben-Arie et al., (1994) *Hum. Molec.*

Genet. 3, 229-35. A second pair of consensus primers, OR3.1-OR7.1 (OR3.1 (TM3), 5'-

GCIATGGCITA(C/T)GA(C/T)(A/C)GITA-3' (SEQ ID NO:435) ; AMAYD(S/R)Y (SEQ ID

NO:436) ; OR7.1 (TM7), 5'-A(A/G)I(G/C)(A/T)(A/G)TA(A/G/T)AT(A/G)AAIGG(A/G)TT-3'

(SEQ ID NO:437); NPFIY(S/R/T/C/W)(L/F)(SEQ ID NO:438), was also used to amplify

primate ORX sequences. See Freitag et al. (1998) *J. Comp. Physiol.* 183, 635-50 and Freitag et

al. (1999) *Canc.* 226, 165-74.

PCR products were subcloned in the TA vector (InVitrogen), and recombinant clones were identified by PCR. Sequencing of the ORX sequences was performed and sequences were assembled and analyzed. The following species were studied: human (*Homo sapiens*, HSA), chimpanzee (*Pan troglodytes*, PTR), gorilla (*Gorilla gorilla*, GGO), orangutan (*Pongo pygmaeus*, PPY), gibbon (*Hylobates lar*, HLA), macaque (*Macaca sylvanus*, MSY), baboon (*Papio papio*, PPA), marmoset (*Callithrix jacchus*, CJA), squirrel-monkey (*Saimiri sciureus*, SSC, and *Saimiri boliviensis*, SBO), lemur (*Eulemur fulvus*, EFU, and *Eulemur rubriventer*, ERU), and mouse (*Mus musculus domesticus*, MMU). In addition, a few zebrafish (*Danio rerio*, DRE) sequences were also characterized using primers OR3.1-OR7.1.

10 Pairwise sequence comparisons and multiple alignments were performed using Gap and PileUp from the GCG package (Wisconsin Package version 8).

EXAMPLE 2: Construction and screening of an ORX-specific mouse sublibrary.

15 Mouse ORX clones obtained by PCR as described above were gridded in 96-well microtiter dishes (1536 clones in 8 plates). For hybridization screening, the clones were robot-spotted in duplicate on high-density filters as described in Rouquier et al. (1999) *Mamm. Genome* 10, 1172-75.. Approximately 90% of the clones were identified as ORX genes. This library was screened to identify clones hybridizing to human ORX pseudogene sequences. Human plasmid DNA probes were radiolabeled to a specific activity of 108-109 cpm/ μ g by random hexamer priming using (-32P)-dCTP (Amersham) as described in Feinberg et al. (1983) *Anal. Biochem.* 132, 6-13. Filter hybridizations were carried out under standard hybridization conditions, and exposed to Kodak X-ray film at -80°C. See Rouquier et al., (1993) *Genomics* 17, 330-40.

20 Three human ORX probes were used: OR1-72, OR912-47, OR15-71 (DDBJ/GenBank

EXAMPLE 3: Sequence analysis of mouse ORX sequences.

To test whether mammals thought to be microsmatic or macrosmatic differ in the fraction of pseudogenes in their ORX repertoire, the ORX sequences in the mouse genome were surveyed. A mouse sublibrary enriched for ORX-related sequences amplified by PCR from the mouse genome was constructed, and nineteen randomly selected mouse ORX clones were sequenced. All 19 have an uninterrupted open-reading frame (ORF) and are potentially functional. These sequences group primarily in family 1 and vary from ~52 to >99% NSI. In addition, in an attempt to bias in favor of selecting mouse ORX pseudogenes, a search for mouse ORX sequences homologous to human pseudogenes was performed. One member was chosen from three different ORX pseudogene families: clones 1-72, 15-71 and 912-47 from chromosomes 1, 15 and 11, respectively. See Rouquier et al., (1998) *Nature Genet.* 18, 243-50. Each of these genes belongs to one of the 3 main groups of human ORX sequences and has accumulated a number of mutations such as stop codons and indel frameshifts. See *id.* The amino-acid sequence identity between these three ranges from 31% to 41%.

High density filters from the mouse ORX sublibrary were then hybridized separately with the three human pseudogene probes at a high stringency. Fourteen clones were sequenced on both strands. These sequences showed 38% to 53% ASI to the human sequences used to select them, indicating that they are not the orthologs of the human pseudogenes. All have an uninterrupted ORF from TM2 to TM7. Together, 33 mouse ORX sequences were sequenced, none of which contained characteristic features of pseudogenes.

OTHER EMBODIMENTS

While the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.